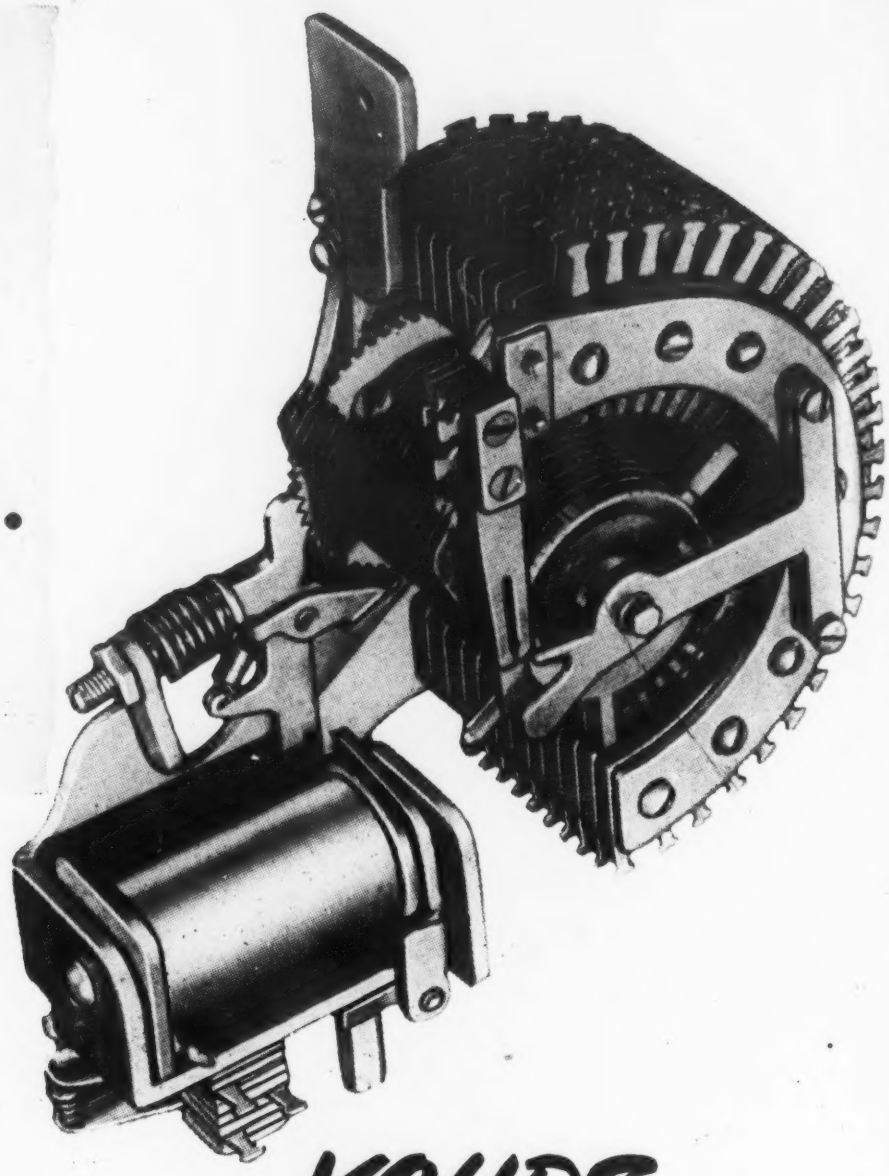
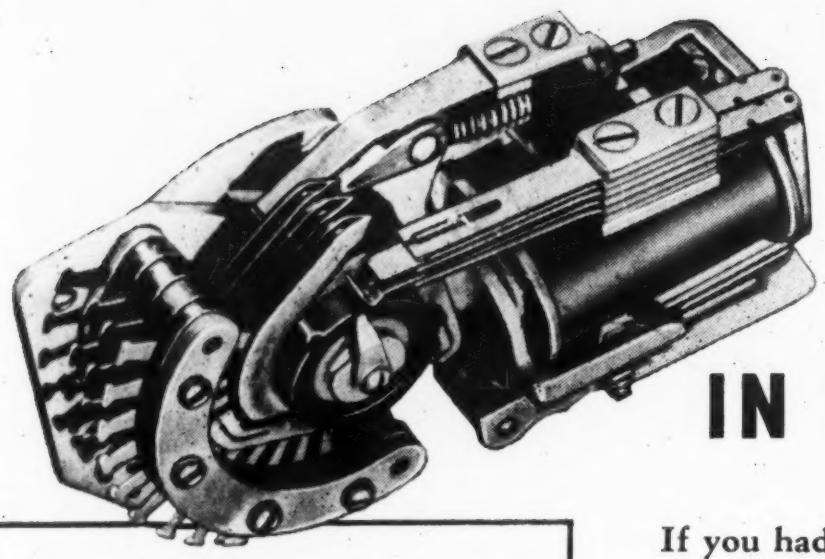
SIGNALS

LAND ★ SEA ★ AIR

MAY-JUNE 1950 ***AFCA Presidents***

NEW DESIGN.... SPEED.... CAPACITIES.... EFFICIENCY





YOURS— IN THESE SWITCHES ONLY!

THE TYPE 44

Miniature Rotary Stepping Switch

An amazing switch! So small it fits in the palm of your hand. Light in weight, too, averaging a mere 14 ounces. Accommodates up to 6 bank levels, each with 10 points plus "home." Can be arranged for 10, 20, or 30 point operation. On 48 volts d-c, runs self-interrupted at 80 steps per second; impulse-controlled at 35 steps per second. Life tested for 200,000,000 steps—and then required only slight readjustment for continued operation. Illustrated directly above.

THE TYPE 45

Rotary Stepping Switch

The finest of its kind for d-c service—and the only one that's completely self-contained for a-c service. Accommodates up to 10 or more bank levels, each with 25 points plus "home." Can be arranged for 25 or 50 point operation. On 48 volts d-c or 115 volts a-c, runs self-interrupted at 70 to 75 steps per second; impulse-controlled, at 35 steps per second. Life tested for 200,000,000 steps—then required only slight readjustment for continued operation. Illustrated at right above.

If you had specified the design and performance requirements for these switches yourself, you couldn't be more satisfied. They have every advantage you want for such applications as:

counting operations—
counting individual units and/or grouping by tens or other convenient multiples.

totalizing operations—
accumulating from one counting and grouping source, or from several in rotation.

remote control selection—
of lighting systems . . .
of radio monitoring circuits . . .
of motor speeds and feeds . . .

In all of these, and in many other applications, you can rely on these switches for smoother operation with faster stepping and positive stopping. Conventional adjustments have been eliminated, too, reducing maintenance during the longer life provided.

When your control job calls for stepping switches, be sure you get all these advantages. They're yours only in these two switches by Automatic Electric. Substantiate this for yourself. Check the facts and figures at the left, or for the complete story, write for a copy of Circular 1698-A.

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"What Makes It Good for Me?"

Charley, who owns a drug store, wants to know why he should care about a profit for the telephone company

The Scene — *A drug store in any one of thousands of cities and towns in the U. S. A.*

The Time — *Lunch time. A man from the telephone company has dropped in. He's chatting with his friend Charley, who owns the store.*

CHARLEY: "What d'ya mean — it's good for me when the telephone company makes a profit? You give me good service and all that but why should I care whether you make money or not? I'm having my own troubles, trying to put in a bigger soda fountain."

AL: "What d'ya mean, 'trying'? Can't you just up and do it?"

CHARLEY: "I've got to find me a partner with some capital. These things cost money."

AL: "Sure they do! It's the same with us at the telephone company. To keep on giving you good service, and put in telephones for people who want them, we must have a lot more central office equipment and cable and other things. And to buy it, we have to get money from our stockholders. They expect a profit — just like your partner would."

CHARLEY: "I guess you're right. Nobody would invest his money here unless I could earn him a profit."

AL: "And here's something else, Charley. Those girls there at the far end of the fountain. They're telephone girls. They're spending a part of their wages with you — putting money into your till to help you make a profit. Thousands of dollars of telephone payroll money are spent right in this town, every week."

ADEQUATE RATES AND EARNINGS for the telephone company have a far-reaching effect. For only a strong and healthy telephone company can pay good wages, contribute to the prosperity of the community and provide an improving service for telephone users. Only through adequate rates and earnings can the telephone company —like Al's friend Charley in the drug store — attract the new capital that is needed to carry on the business.

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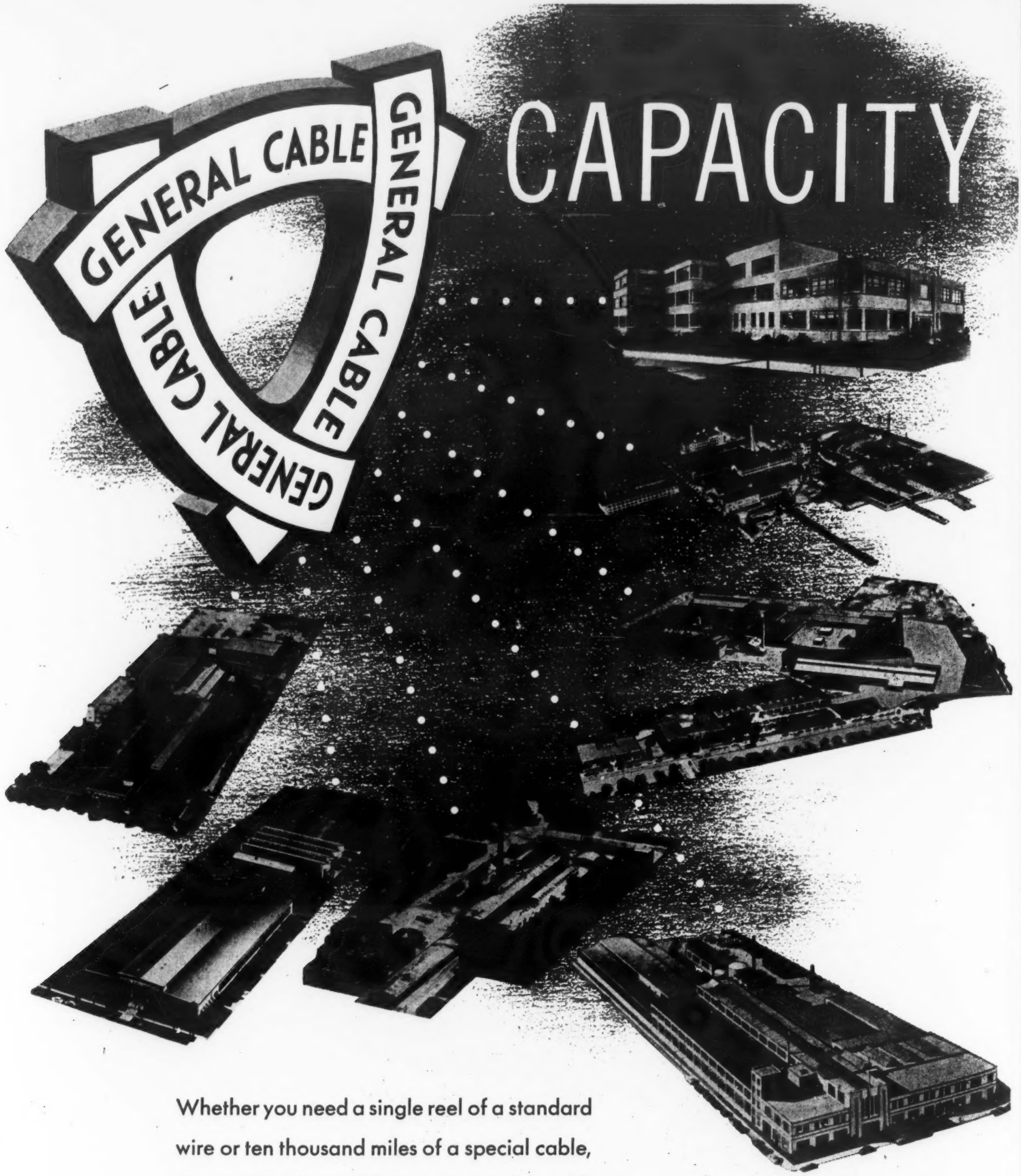
CAPACITY



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SIGNALS

Journal of the Armed Forces Communications Association

VOLUME 4 | MAY-JUNE, 1950 | NUMBER 5

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Picture Credits: All pictures official Army, Navy, or Air Force photos unless otherwise credited. Especial recognition is given in this issue to the Signal Corps photographic section, Fort Monmouth, and the Signal Corps Photographic Center, Astoria, New York, for the extensive photo coverage on the AFCA 1950 convention. Many of these photos are shown with the convention story beginning on page 13.

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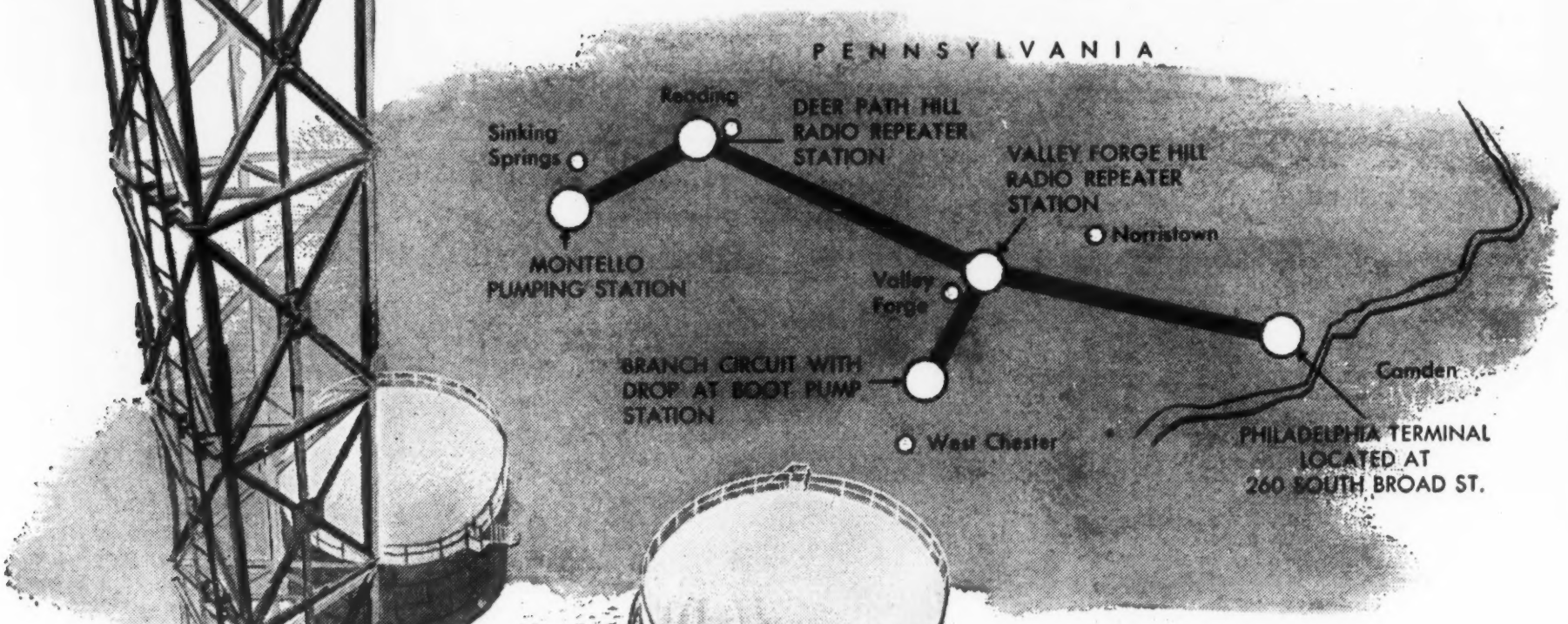
THE COVER

Retiring AFCA President Frederick R. Lack (left) and the new president, Theodore S. Gary, who was elected May 12th at the AFCA annual meeting, are shown on the cover for this issue.

"PTM" in the Pipeline industry an IT&T *first!*

Federal's Pulse Time Multiplex, first microwave radio relay system ever installed for pipeline communications
...an IT&T development

NEW to the pipeline industry—new even to communications itself—is "PTM," one of the most flexible, economical and dependable communications systems ever devised. Developed in IT&T laboratories and manufactured by *Federal Telephone and Radio Corporation,* an IT&T associate, pulse time multiplex is an improved type of microwave radio relay that provides multiple speech channels and unattended telegraph, telemetering, remote control and other signaling facilities . . . without wire lines or costly maintenance. This is the communication system of the future . . . available now to private industry for its private use.



Latest installation of Federal's "PTM" is the first in the pipeline industry — for the Keystone Pipe Line Company, subsidiary of the Atlantic Refining Company — a 60-mile span that can be readily extended.

IT&T

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
67 Broad Street, New York, N. Y.

By Lt. Colonel Bertram Kalisch, Sig. Corps

SHOOTING AT 40 Below

Exercise Sweetbriar, Photographer Ballinger, Signal Corps cameraman, photographs the town of Whitehorse, Y.T. Canada from the rim of a plateau in which the CRAF base is located.

Soon the Armed Forces will be seeing what the shooting was all about in the 1950 Arctic winter maneuvers . . . the 10-day battle against the elements and the Aggressor up the Alcan Highway from Whitehorse in the Yukon to Northway, Alaska.

The Signal Corps Photographic Center is preparing a 30-minute training film on Exercise Sweetbriar and the Armed Forces Screen Report is planning an issue combining the arctic and tropic meneuvers, Sweetbriar and Portrex. This article, in event the reader has not yet suspected it, is on the "below zero" photography exercise.

When I received orders to direct and coordinate photography on the then-classified "Exercise Sweetbriar" I thought they had me mixed up with a pipe smoker. When a preliminary briefing indicated we were to film the 1950 maneuvers in the super-frozen North at temperatures ranging from 20 to 50 below, it sounded like a pipe dream.

Some military men still cling to the idea that motion picture cameras are like buns. If they jam, take 'em apart and fix 'em right there. If they're not fixable, turn 'em in and draw another. With great patience and resfraint, we once again point out that there aren't as many cameras as guns, they are not as stalwart and simple, and if you monkey with them in the field, you can end up with $2,000 worth of cute little gears, lenses and spare parts—but no camera. In fact, some are so temperamental, they jam or go out of focus at critical times just to spite the cameramen. At least, that's the cameraman's alibi when he brings in a blurred replcia of the shot of the year.

Shakedown—and up!

In the planning phase, there was plenty to be done. With the help of Major Halvor T. Darracott, my deputy; Major Marshall Berard, of Army Pictorial Service, and the technical experts of the Signal Corps Photographic Center the motion picture cameras—singlelens Eyemos—and the still picture cameras—Speed Graphics—were "winterized"—tested—and sent to Camp Carson, Colorado, with eight camera-

Exercise Sweetbriar, Photographer Carson photographs three aggressors reloading machine gun (burp gun) clips. Aggressors were ambushing Allied Force in an attempt to halt advance toward White river.

men, four motion picture men from SCPC led by Lt. Herman Klappert, and four still men from the 167th Signal Photo Company led by Lt. Gaynor Gibson. In addition, the 167th also supplied a three-man still Lab crew and a miracle-working camera repairman, Cpl. Raymond W. Kennedy.

In January, the photo detachment arrived at Whitehorse in the Yukon with plenty of determination and film. They had been "shaken up" as well as "shaken down" on the overland and air lift from Camp Carson to Whitehorse. All reported their cameras and themselves in working order.

Self-appointed G2's lose pix

Pre-maneuver training in the Yukon brought out an interesting fact. COs of small units in the field often assumed that their military duties included directing the cameramen and telling them when and where—and how—to take pictures. If the Capra urge did not overcome them, they would become G-2s and forbid the cameraman to take any pictures at all. There weren't many of either type on this maneuver, but just enough to cause headaches. One fly in the negative soup can lose the Army a lot of pictures.

Exhibit A was the search for the lost C-54, which disappeared in the Alaska mists just before the maneuver.

Naturally, all our camera teams were alerted so they could accompany the rescue parties when the time arrived. Meanwhile, one of the search planes, a C-47, crashed and was spotted. A rescue party was organized, including reporters and photographers. Two of my cameramen, chosen for endurance, rushed down the Alcan Highway in their truck to enter the woods and make movies and stills of the dramatic rescue.

Both men were non-coms but we had reckoned without an un-named captain who turned up on the highway at a critical moment. As the cameramen prepared to follow the rescue party into the woods, he stepped up and informed them they could not leave their truck on the road unattended; it was against regulations. When they protested that the drivers of the other trucks would see that no one drove off in theirs, he sternly reminded them that he was an officer and he decided they would both have to guard their truck—no matter what instructions they had gotten from the deputy maneuver commander's headquarters. The result was no pictures.

What the self-appointed censor did not know was that his action lost the Army its best chance to secure actual motion pictures of how the Medical Department treated and handled injured men and the "on-the-spot" technique of arctic rescue.

But to prove you can't keep alert cameramen in a pictorial straitjacket by quoting regulations or pulling rank, I offer Exhibit B—Corporal B's mission.

Like his luckless buddies, he was sent to accompany a rescue party. This party loaded weasels on a plane to carry them to a lake, where they were to be available for inland search.

Cpl. B filmed the loading at the RCAF Base. Just before the take-off—although Cpl. B had arranged with the lead pilot to fly with the party—another self-appointed censor decided there should be no pictures of the flight or unloading on the lake. He informed Cpl. B that no one but weasel drivers could go on the plane. Reluctantly Cpl. B started to pack up his equipment.

After the take-off, Cpl. B was found on the plane. Fortunately, his self-imposed censor wasn't. And here's how it happened. Cpl. B volunteered as a weasel driver. And since everyone knows you can't drive a lashed down weasel in a plane en route, he used his spare time in flight to make the necessary pictures.

Memo Institutes Reform

Despite the happy ending, I repeat, we don't want sparetime photographers —or photographers "graciously permitted" to make pictures. Photography is a full-time job.

Brigadier General George C. Stewart, deputy maneuver commander, thought so, too. I quote from a special memorandum to commanders of all headquarters, units and detachments:

"The mission of CJPIB (Combined and Joint Public Information Bureau) is to gather unbiased information with photographic coverage under the terms of the U. S.-Canadian Information Agreement. . . .

Deputy Secretary of Defense Stephen T. Early congratulates the author, Lieutenant Colonel Bertram Kalisch, on commendation received from Lieutenant General Stephan Chamberlain, CG, Fifth Army, for photographic supervision of Exercise Sweetbriar.

"It is requested that all commanders *co-operate with* and *give assistance to* personnel of the CJPIB in the *accomplishment of their mission.* Instructions should be issued to *all subordinates of their mission.* Instructions should be issued to *all subordinates to insure the necessary co-operation.*"

The memorandum was issued as a result of the incidents mentioned and a few others involving the press. Followed up by personal indoctrination by Major Mel Vorhees, public information officer, an dmyself, the memo did the trick. Our cameramen were enabled to cover the maneuvers without undue interference.

Accounts Stress Realism

Some topnotch correspondents covered Exercise Sweetbriar from start to finish. Now, in daily briefings, Lieutenant Colonel Lloyd Hellmann, chief umpire; Wing Commander Cameron, RCAF, and their dashing ground and air umpires could make the "simulated maneuver" sound like a hell of a battle. And the correspondents could do even better, filling the sky with dog fights, and the Alcan Highway with battling patrols.

Reading the press dispatches, many a Hollywood writer no doubt drew inspiration for the next "Mounties against the Mountains in the Yukon."

After reading one account, I dashed to the banks of the Donjek River myself to see the "companies of weasels" charging across the ice—a 1950 version of the charge of the Light Brigade.

But I wasn't the only one carried away by these verbal Armageddons of the Arctic. Before the Princess Pats even contacted the Aggressors, I received a radio from Washington demanding that we supply "authentic pictures" of the battle—weasels charging across the ice, ski patrols dashing at each other in combat, the bombing of convoys and bridges. The radio intimated we were all sitting around the stoves in the sheltered nooks of the Yukon and letting the rugged combat troops nearly die for dear old Sweetbriar without covering the epic struggle.

But Not Always Photogenic

I showed the radio to the field commanders and suggested they equip their weasels with snorkels and go out and submerge for posterity, but they would not be cajoled. They insisted the Department of Defense would take a dim view of weasels disappearing into open leads on the Donjek.

To salvage something, I finally jeeped up and down the Alcan Highway to station my camera teams in the thick of the fight. Starting from DMC HQ on the banks of the Donjek, I went six miles south and contacted the advance patrol of the Princess Pats. The outpost was one solitary sentry who looked rather forlorn and could be spotted a mile away. Somehow, it didn't feel like combat.

So I turned around to cross the Donjek, where the press had the Aggressor patrols on the other side, snarling like wolves and daring the Princess Pats to come near.

One hour later and twenty miles north of the banks of the Donjek, I contacted the most advanced Aggressor patrol.

Yet that was the day the press had the boys swaying in combat, with fire fights all over the place. We couldn't find any small arms that would shoot 26 miles—the distance between the forces—or a camera that would shoot that distance either. So everyone had to wait.

When the forces finally sighted each other, the "Battle of the Donjek" began. Lieutenant Klappert and I crossed on the trestles and took position on the causeway between the opposing forces to film the terrific artillery barrage the Aggressor was going to lay down.

After freezing for half an hour at 37 below, we finally got two weak white-ball smoke puffs above the jackpines. That was it.

In the clippings my wife saved for me, I read about the "heavy barrage" that sent the Princess Pats reeling in their tracks on the banks of the Donjek.

Although they were effective from a training and test standpoint, the maneuvers were not always "photogenic." So we made the most of it, resulting in an episode we photographers called "The Capture of the Road Block."

At the time, we had operating in the combat zone 14 photographers of all forces and the press. The Signal Corps had four teams, one movie and one still man in each; the Canadian Army had two still camera officers; the Royal Canadian Navy had two 16mm color cameramen; the U. S. Marines had one officer-cameraman, and Associated Screen News of Canada had their representative, Ross Beasley.

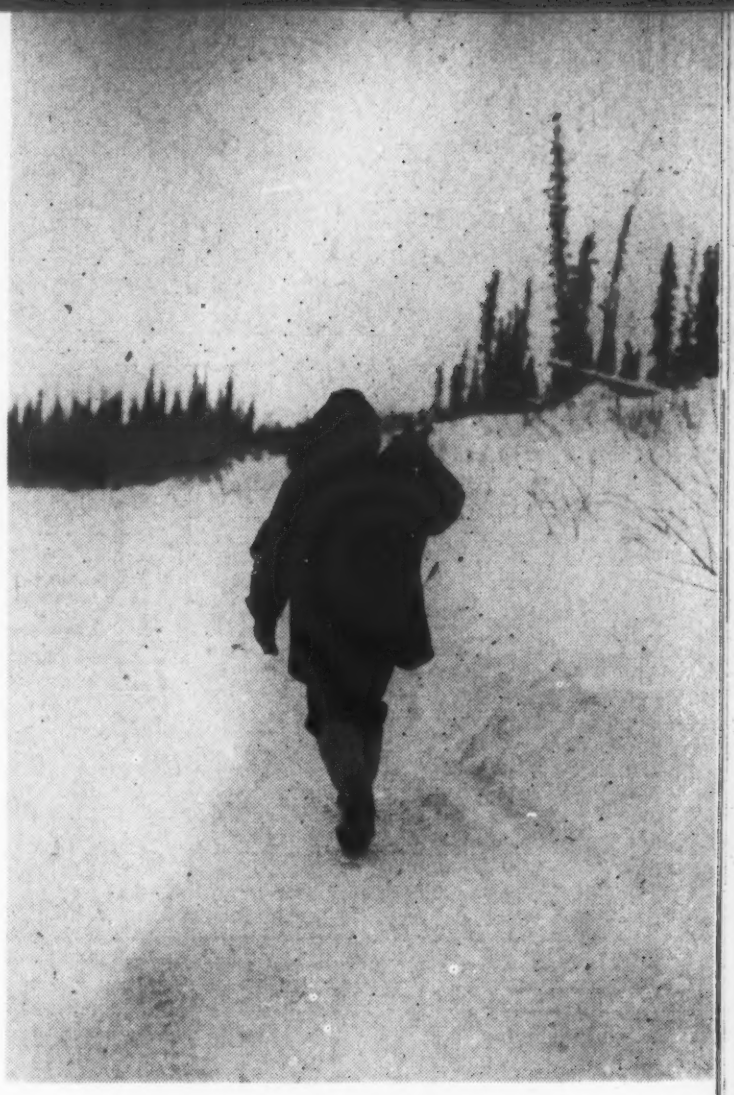
This particular day, things were fairly quiet, so the DMC team—Lt. Klappert and Cpl. Lagrone—set out by truck to cover a road block the Princess Pats were to capture after "fierce resistance."

They barreled up the Alcan Highway looking for a combat road block. En route, they passed two lonely Aggressors standing by a broken-down jack pine which was about half-way across the road. The Aggressors waved them on as they were flying the neutral green umpire flag. When they got to the White River Bridge, they decided they had over-run the road block so they back-tracked. When they saw the two Aggressors again, they stopped and discovered that the wreck of a jack pine was a "simulated road block" and the two Aggressors, a strong "holding force."

Sadly, the team parked its truck a hundred yards down the road and prepared to cover the "flight." Soon, along came the Royal Canadian Navy cameramen. Seeing the Signal Corps camera truck, they promptly parked behind it and went into action with their 16-mm cameras.

A few minutes later, the Canadian Army photo truck arrived after a lean day in the field. Seeing the other two, they parked behind the RCN truck and joined the camera patrol.

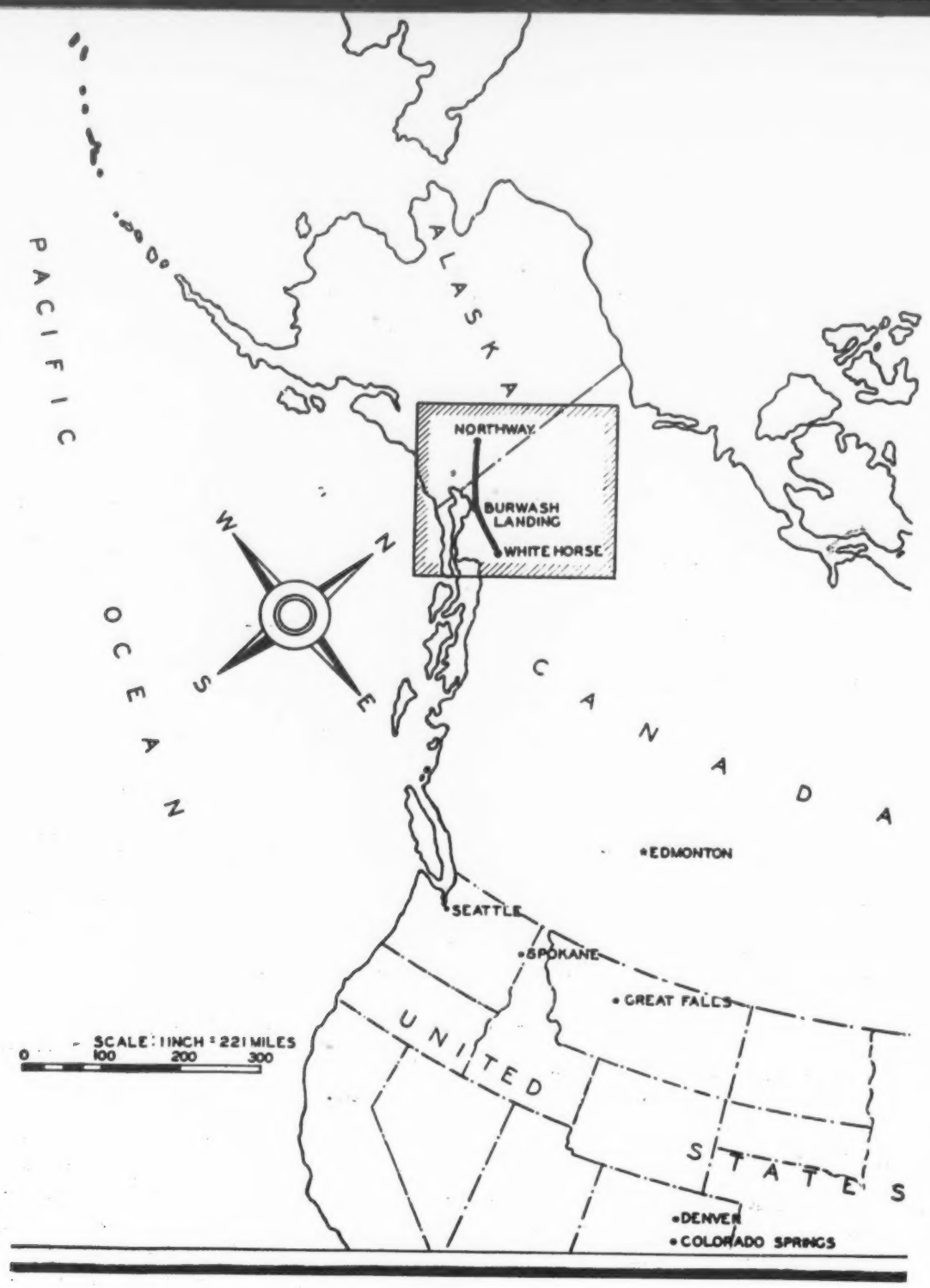
(*Continued on page* 60, *col.* 3)

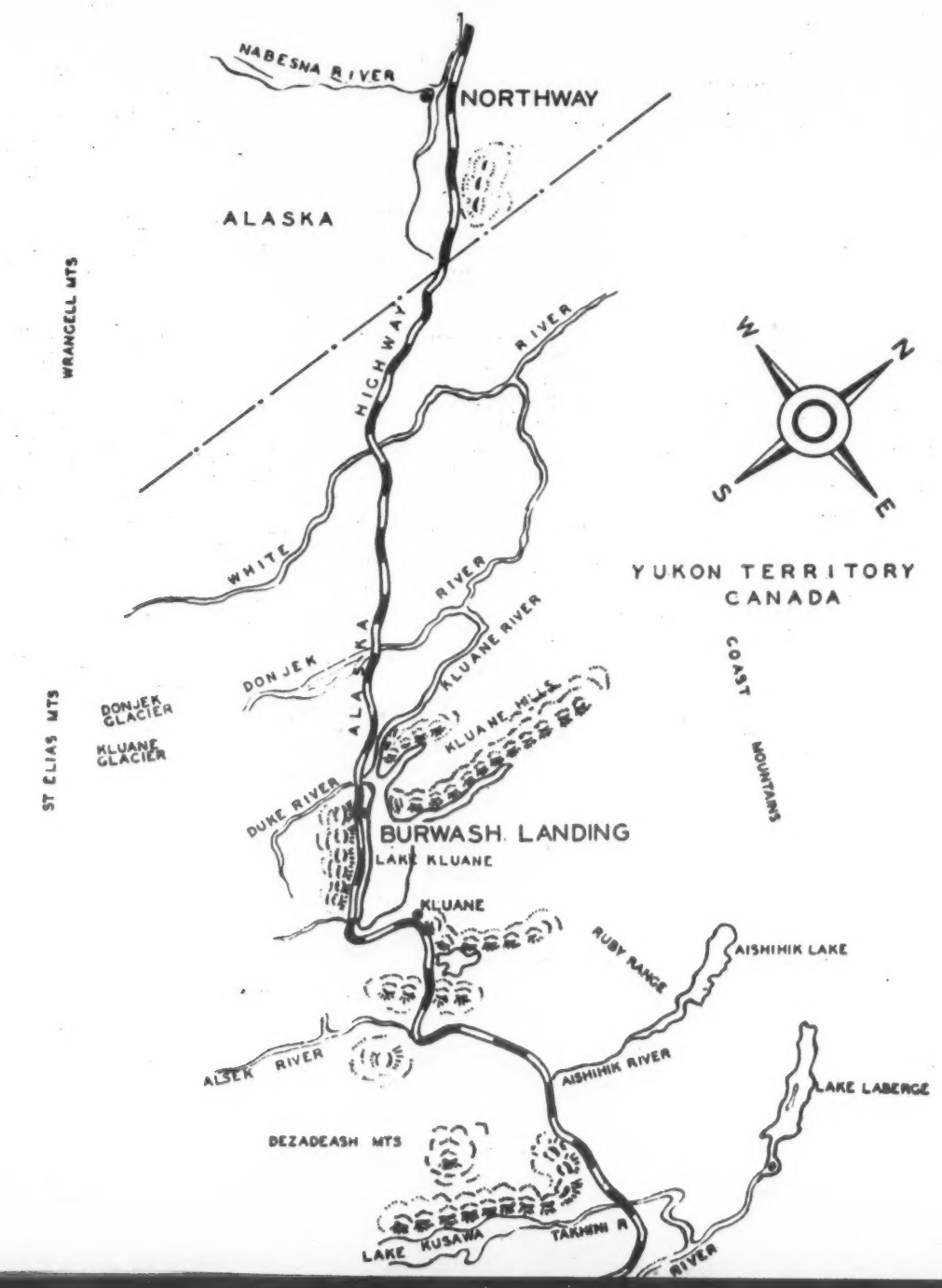


A weary cameraman, Lt. Herman Klappert, SigCorps, trudges down Alcan highway—photographed by cameraman LaGrone.

The Author

Lieutenant Colonel Bertram Kalisch is currently assistant chief, newsreel section, office of public information, Department of Defense. A former newsreel editor and writer in civil life, he became executive producer of Army Air Forces training films at Wright Field from 1941-1943, completing his duty there as chief, AAF combat film section. Overseas, he was public relations pictorial officer on General Bradley's 12th Army Group staff until V-E Day, acting as combat assignment chief for photo units in the First, Third and Ninth Armies. On a secret trip to German HQ, he persuaded General Elster to surrender himself and 20,000 troops before the cameras in September, 1944. In July, 1945, he became photo officer at General MacArthur's GHQ, serving under General Akin, and supervised all the photography on the USS Missouri during the surrender ceremony. In 1946, he reorganized the morale films section, Signal Corps Photographic Center, before reverting to inactive status to join the Department of State's motion picture division. In 1948, he returned to active duty as assistant chief, studio division, SCPC. He was director of photography for the U. S.-Canadian Forces on Exercise Sweetbriar and completed "Invisible Rampart," a film on the Alaska Communication System, recently at SCPC.





SIGNALS

By Col. Glenn H. Palmer, Sig. Corps

During February of this year there took place in the Yukon Territory of Canada and the eastern part of Alaska a military maneuver which was of especial interest because of the varied sources from which the participating forces were drawn and because of the weather conditions prevailing during the exercise. The first combined peace time maneuver of United States and Canadian armed forces, "Exercise Sweetbriar" represented the first important test of the ability of these troops to carry on combat operations, and their support, using standard equipment in extremely cold weather.

The Allied Forces Participating

Participating forces in Exercise Sweetbriar came from the United States Army, the United States Air Force, the Canadian Army, and the Royal Canadian Air Force. The allied ground combat forces consisted of two battalion combat teams, one each Canadian and U.S., some of the Canadian troops trained as paratroops. The allied air force elements involved operated some 85 planes, of all types except heavy bombers. Service troops of the United States Army alone supporting the Allied Force totalled some 752 officers and enlisted men. The organization of these forces is shown in Chart I. Opposing them was an Aggressor Force comprised of 492 men and 5 planes of the Alaskan Command. *See chart, next page, col. 3.*

Overall responsibility for planning and directing the exercise was vested in the Commanding General, Fifth U. S. Army, Lieutenant General Stephen J. Chamberlin, as Maneuver Commander. Personnel and units participating in the Exercise were provided by the Fifth U. S. Army, the Fourth U. S. Air Force, the Western (Canadian) Army Command, the Northwest Air Command, RCAF, and the Alaskan Command (U. S.). The commanders of all these commands, with their several staffs, participated in the preparation for and conduct of the Exercise.

The Preparatory Phase

United States Army service troops required to prepare bases and staging points for the exercise and for the movement of combat troops to and from the exercise area began moving by motor over the road from Camp Carson, Colorado in July 1949. These troops, as did all later highway convoys, moved via Great Falls, Montana; Edmonton, Alberta; Dawson Creek, Alberta and the Alaska military (ALCAN) highway to Whitehore, Yukon Territory, taking on the average about 20 days for the trip. Some of these troops were required only for the preparatory phase, and returned to their home stations in December. Others remained at Whitehorse to take part in the exercise and close-out the base activities after the exercise.

Combat troops of the United States forces (including the bulk of the Signal troops) moved from Camp Carson to Whitehorse during January 1950, mostly by highway convoy. Approximately 625 ground combat troops were moved by air, with combat equipment, in two lifts. Participating Canadian forces similarly moved by both motor and air to the exercise area principally during January.

ARCTIC MANEUVER

All U. S. Army troops participating in the exercise were given cold weather indoctrination during the winter months preceding the exercise, U. S. troops at Camp Hale, Colorado (in the Rocky Mountains above Colorado Springs) and at Whitehorse. Much of the equipment used during the exercise, while of standard types, was especially processed by using troops assisted by technical specialists, to insure its ability to function under conditions to be met in the exercise. All personnel in the area during the exercise, whether participating or observing, were provided with standard items of clothing suited to the climate encountered. During the exercise there were very few casualties, and those only minor, which could be ascribed particularly to the cold weather. In general the health of the participating troops during the exercise was as good as, or slightly better than, the normal health rate at their home stations.

The tactical conception which guided operations during the exercise was that the maneuver enemy, "Aggressor," had seized air fields in Alaska and was advancing southeastward along the ALCAN Highway in Yukon Territory. The Allied Forces were required to stop his advance and retake the airfield at Northway, one of the easternmost in Alaska. This action involved movement of reserve forces into contact with the enemy by motor at night over a distance of 220 miles, and a ground advance through combat operations against the enemy over a distance of 142 miles. The ALCAN highway was the axis of advance since there are no other through motor roads in the area. Due to the many mountains in and immediately surrounding the exercise area, movements of forces off the highway were generally limited to distances of the order of five or ten miles, such forces moving by tracked vehicle or on foot.

Signal Operations

The general consensus of opinion of those who observed or took part in the exercise is that, with prior indoctrination such as that received by the participating troops, and proper preparation of equipments, it is definitely practicable to carry out an operation of this kind. There are, of course, improvements in mind which will make such operations in the future more effective from all points of view.

Now let's look at the exercise from the Signal point of view. Signal communications within the battalion combat teams were quite normal in terms of types and amounts of equipment used and operating personnel. Signal communications within the Allied and Aggressor forces above battalion level, communications for umpire, maneuver control and administrative purposes, and logistic support of all signal operations other than airborne were provided by approximately 300 officers and men of the U. S. Army Signal Corps and 104 troops of the Royal Canadian Corps of Signals. The Canadian signal troops furnished communications and logistic support for the Canadian battalion combat team and the accompanying umpires, while the United States signal troops provided communications for the United States Army forces and to link the various exercise activities above the battalions of the different forces among themselves and with the world outside the exercise area. Communications to the outside world were carried on over the facilities of the Northwest Communications System (Canadian) and the Alaska Communication System of the United States Signal Corps. U. S. Army Signal Corps troops taking part in the exercise were the 229th Signal Operations Company from Fort Monmouth and detachments of the 167th Signal Photo and 181st Signal Depot Companies from Fort Meade, Maryland.

Communications Net

Mobile radio stations of considerable power accompanied all convoys moving to and from the exercise area, and altogether some 43 radio stations were operated by United States and Canadian troops in addition to the very portable, short-range stations which are organic equipment of the battalion combat teams, and the radio stations in aircraft. Voice and teletype channels over radio relay equipment linked the commanders of the battalion combat teams to the Allied Army Forces commander's headquarters, while similar channels provided by the facilities of the Alaska and Northwest Communication Systems linked the Allied Army Forces command post, at which was located the Joint (Air-Ground) Operations Center, to the Allied Force commander's CP, to the forward flying field and the fixed bases of the Allied Air and Army Forces. All these were similarly linked to the headquarters from which the maneuver commander and the chief umpire controlled the maneuver, and that headquarters linked to the Aggressor Force and its base at the west end of the exercise area.

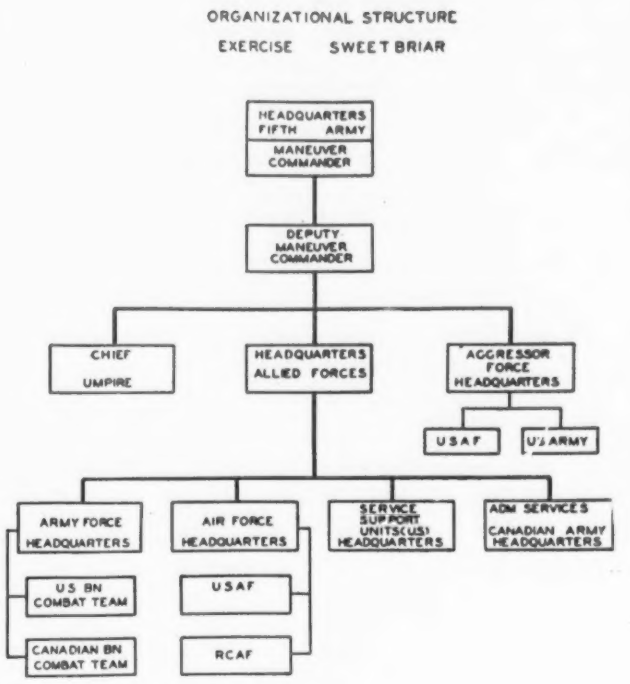


Chart I.

Communications of the magnitude and nature required by Exercise Sweetbriar, and other Signal Corps functions involve problems of funds, personnel, and types of equipment which are frequently met and solved by signal communications agencies of all the armed forces and by civil agencies, but there were inherent in the exercise other problems of more unusual nature whose solution was required. These problems are grouped and discussed below under their general causes. The causes which gave rise to them in this exercise will give rise to much the same problems in any future exercise or combat operation in which the same factors are present, and their solution in thils exercise should facilitate future operations.

The problems arising from the organization of the military forces taking part in the exercise have been touched on above in indicating the amount of communications required. In considering these communications with a view to determining what might be required for another more or less similar operation, the effect of the organizational factors and peacetime conditions under which this exercise was held must be recognized.

In Exercise Sweetbriar troops performing signal functions outside the battalion combat teams totalled (U. S. and Canadian) 404, 12% of the whole ground force, 8.5% of the total force taking part in the Exercise. Compare which Signal troops represented at peak this with 3.88% of the total U. S. force which Signal troops represented at ptak strength in the European Theater during World War II.

In considering this ratio between Signal troops and total force for the purpose of determining what would be an appropriate strength for the signal element of a force waging actual warfare such as was simulated by Exercise Sweetbriar, there are several conflicting, modifying factors which must be considered.

First, in actual combat there would be no need for communications serving umpires and for control of Aggressor by the maneuver commander, such as increased materially the signal communications requirement of the Exercise. This would decrease the need for signal troops, in this case numbering one officer and 30 enlisted men.

Second, in an actual operation it would be necessary to provide for reconstruction and maintenance of the wire lines which would suffer considerably from enemy action. In Exercise Sweetbriar the wire lines of the Alaska and Northwest Communications Systems were available for tactical use above the battalions and were ruled immune from hostile action, so no line construction and maintenance troops were required except for minor field wire installation.

Third, The Signal troops which operated communications for the Allied Force in Exercise Sweetbriar, serving the comparatively numerous ground and air-ground activities scattered over distances totalling up to more than 300 miles, could with little augmentation have provided communications for a larger, similarly organized force. There are certain minimum requirements for personnel and equipment comprising a communications system. Increases in volume of traffic above the minimum need not result in proportionate increases in personnel and equipment. Whether or not a significantly larger force could be supported logistically and operate effectively under the conditions of climate and geography encountered in Exercise Sweetbriar may be determined after an exhaustive study of the results of this exercise.

Joint Procedures

Since forces participating in Exercise Sweetbriar came from air and army forces of two nations, the matter of communications operating procedures presented some problems. Fortunately, the activities of the Joint Communications-Electronics Committee of the United States Joint Chiefs of Staff had already resulted in the establishment of instructions to guide the operation of communications of joint interest to the Air and Army forces of the United States. These same procedures were accepted by the Canadian Forces for use in communications of combined U. S.-Canadian interest. In those cases where procedures used by a force for its own internal communications differed from the joint procedures, the individual procedures were not required to be changed for intra-force use, but the joint procedures were applied in all communications of a joint or combined nature.

In the Canadian Army codes and ciphers are responsibilities of the Operations Officer ("G-OPS") rather than of the Signals Officer. This resulted in an additional step necessary in the coordination of cryptographic matters of combined interest. In view of the fine cooperation of the commanders and staffs of all forces involved in the exercise this did not result in any difficulty in solving communications security matters, but is mentioned as an item of interest to communicators.

Central Planning Advantage

The fact that the staffs and forces assembled for Exercise Sweetbroar did not constitute a permanent organization meant that much of the planning and preparation for the exercise must be done by individuals and staffs having other primary responsibilities. Since the commanding general, Fifth Army was maneuver commander, his staff planned and coordinated the exercise as a whole. Since the U. S. Army forces taking part in the exercise were provided by Fifth Army, the staff of the Fifth Army Headquarters also planned the administrative and logistic support of those forces, as well as nontechnical support of U. S. Air Force eléments. Except for the cold-weather training, movement to the exercise area, and tactical activities in that area, signal communications and signal supply planning centered in the Fifth Army signal office. The centralization of signal planning had certain advantages in insuring coordination of that planning, but it was sometimes difficult to determine which one of the several signal officers' hats should be donned for the task of the moment. The considerable geographical separation of the several headquarters involved in the planning and preparations for the exercise made coordination more difficult than if all planning had been at one location, but occasional trips by staff officers to cooperating headquarters did result in preparations which made possible a very successful maneuver.

Since the exercise took place for the greater part in Canada, it was necessary that radio frequencies used in the exercise area be coordinated with the Canadian government. The Canadian governmental agency involved is the Department of Transport. All requirements for radio frequencies in the exercise area had to be secured from the various participating forces, coordinated among themselves and then further coordinated with the Canadian Department of Transport. This latter coordination was effected through two different channels; through the Office of the Chief Signal Officer, U. S. Army with regard to particular transmissions likely to have long-distance effects, and through the Command Signals Officer, Western Army Command of the Canadian Army for the frequency plan as a whole.

ACS & NCS Carry Burden

In order to stay within prescribed limitations on personnel to take part it was early realized that primary dependence for long distance communication in the exercise would have to be placed on the wire lines of the Northwest and Alaska Communications Systems. Plans had to be drawn not only for the channels to be established over

Exercise Sweetbriar—Yukon territory. . . . Soldier signal experts operating portable radio equipment listen for possible word from the C-54 transport which disappeared over the Yukon while en route from Anchorage to Great Falls.

Signal Corps stations were tied into the wire line of the Northwest and Alaska Communications Systems for Exercise Sweetbriar.

these facilities for exercise purposes, but also for the provision of equipment to make those channels possible. Additional equipment had to be secured by and for both the Northwest Communications System and the Alaska Communication System, and the technical nature of that equipment coordinated with the equipment of the tactical Signal Corps stations which were to be tied into the common system. In some aspects the differences between the fixed types of equipment used in the commercial communications systems and the portable field equipments introduced complications which are not ordinarily met in planning a purely fixed plant or purely field system. The 3 physical pairs of wires of the Northwest and Alaska Communications Systems traversing the exercise area are so fully loaded by normal traffic through carrier equipment that only a limited number of channels could be made available for exercise purposes. Furthermore, because of the limited number of outlets which could be obtained from the carrier channels of the fixed wire system in the exercise area without affecting adversely the channels being used for commercial purposes, it was necessary to place some restrictions on the location of the activities connected to the fixed wire system.

NCS Goes Mobile

In some cases non-military telephone subscribers permanently located in the area were, during the exercise, given telephone service through military switchboards in order that maximum military use might be made of the available channels.

During the exercise, personnel and carrier equipment of the Northwest Communications System were made mobile and moved with certain of the tactical activities served over the fixed wire lines, and only NCS personnel were permitted to connect to the fixed wire lines except in major emergency. For such emergencies certain especially instructed personnel were equipped with telephone instruments of a type which could be connected to the wire without disrupting carrier communication.

Sub-Zero Difficulties

Natural factors which introduced problems into signal communications operations in Exercise Sweetbriar are temperature and location—location in both the geographic and the geomagnetic senses.

What is meant by "extremely cold weather" referred to in the first paragraph of this article may be gathered from the fact that temperatures of —60° fahrenheit are common in this area during the winter, while —84° has been recorded. The lowest temperature actually encountered during Exercise Sweetbriar was —45°. Temperatures of this order reduce electrical activity of electrical batteries, make difficult the starting of motor vehicles, gas-engine driven power units, and increase friction between equipment parts whose relative movement is normlly facilitated by grease or oil.

Dry batteries manufactured especially for operation at low temperatures were provided by the Signal Corps and operated satisfactorily for limited periods of time. Some dry batteries of types used generally in temperate climates were used with chemical heating pads, but in general the results obtained from the heating pads were not satisfactory. Small dry batteries could be kept warm by being carried inside the clothing of operating personnel. Radio sets of the walkie-talkie type were operated satisfactorily by this last scheme. Storage batteries having especially concentrated electrolyte were also used successfully, except when discharged too far they would freeze just as would a standard battery.

Motor vehicles of the U. S. forces in addition to personnel heaters, were generally provided with heating systems which circulated warm water through the engine block and through a coil under the starting battery which was housed in an insulated case. This made it possible to start the engine even in low temperatures noted above. The same heating system was provided for the gas engines of some of the trailer-mounted 5-10 kw power units used gy the Signal Corps, and worked very satisfactorily. These same power units were housed in wooden shelters constructed on the trailers, which enabled mechanics to work on the units comfortably in spite of outside temperatures. Other power units of the same type were sheltered only by the tarpaulins normally supplied. These latter were provided with heaters of the warm-air type, which served very satisfactorily to warm the units sufficiently to enable their starting in the coldest weather. The limited space inside the tarpaulin-covered shelter of this type installation did not permit mechanics to work on the units without exposing them to the surrounding weather.

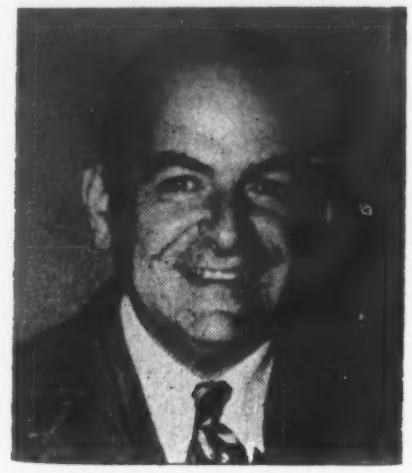
Power units of smaller size, which are normally operated on the ground, operated satisfactorily during Sweetbriar so long as their oil pans were insulated from the snow-covered ground. When operated directly on the ground, however, the heat of operation was not enough to keep the lubricating oil flowing freely, a fact which was learned through sad experience in at least one case.

Lubricant Use Ruled Out

Signal equipment having parts which are required to move occasionally but not continuously had to have all grease or other lubricant removed to insure satisfactory functioning when the equipment was exposed to the outdoor temperatures. This applied particularly to the tuning controls on radio apparatus and the shutters of both motion and still cameras. In motion picture cameras even with all grease removed some difficulty was experienced from binding of slightly bent shafts which had operated satisfactorily under normal conditions of temperature and lubrication. Photographic laboratory operations of the Signal Corps in the exercise area were less than satisfactory because of the lack of sufficient temperature control and limited supply of chemically pure water. Only a necessary minimum of photographic laboratory work for immediate use was done at Whitehorse,

(*Continued on page* 64)

From the President



The outgoing president thanks the members for their help and urges continued effort toward building a strong association

This is the last letter to you that I can sign as President of our Association and as such it might well be a report on what has been accomplished during the last year. But annual reports are usually pretty dreary reading especially in their "mutual admiration" aspects. So let's skip it this time.

However, I can't let this opportunity go by without complimenting the New York and Fort Monmouth Chapters on the success of the 1950 Annual Meeting. A great deal was accomplished at the business meetings in New York. The banquet was the "best ever" with a magnificent twenty-minute inspirational message from General Harrison as its climax, and the show at Fort Monmouth the next day was, to use the jargon of our modern youth "just out of this world."

If anything were needed to demonstrate the maturity and purpose of this Industry-Service team, which is our Association, this two-day meeting should leave no doubts in anyone's mind.*

Under the leadership of Ted Gary, your new President, ably assisted by George Dixon and the Washington staff, I am certain the coming year will see the current upward trend of membership and chapter activities continued and expanded. But Ted and George cannot do it without your help. If you really believe in this idea, won't you demonstrate your faith by helping in every way you can to build a strong Association. More members—individual and group, better chapter meetings, and a wholehearted devotion to the cause of a strong U.S.A.

Thanks for all the help you gave me this year.

Frederick Lack

*On reaching home after the Monmouth show, I wrote "Duke" the following letter. I am sure those of you who were fortunate enough to be with us at Monmouth on AFCA Day will subscribe to this statement.

May 15, 1950

Maj. Gen. F. H. Lanahan
Commanding General
Fort Monmouth, New Jersey

DEAR GENERAL LANAHAN:

On behalf of the directors and membership of the Armed Forces Communications Association, I want to express my appreciation to you and your staff for the splendid program which you put on for us last Saturday.

As you know, the preamble to the Constitution of the AFCA outlines as the Association's principal objective "cooperation between the Armed Forces and Industry in communications and photography in time of peace as well as in time of war." The meeting which we have just concluded at Fort Monmouth is proof positive that the Signal Corps is determined to do its part and more in accomplishing this objective.

Those of us who were familiar with the tactics and equipment of the last war were amazed at the progress that has been made in the few years since that war. New methods of wire laying, new weapons, the pinpointing of airborne troops, the impressive array of new equipment, all served to reassure us that the Armed Services are leaving nothing undone to make this country strong.

The precision with which the program proceeded, the efficiency in handling the crowd, the quality of the demonstrations and the exhibits, left us all with a very healthy respect for the planning proficiency of your staff.

Would you please convey our respects to Colonel J. D. O'Connell, Colonel W. F. Atwell, and the many others—both Service personnel and Civilians, men and women—who must have worked very hard and beyond the call of duty for many months to put on this program. Please tell them that mere words cannot express our thanks for being permitted to participate in such a superb show.

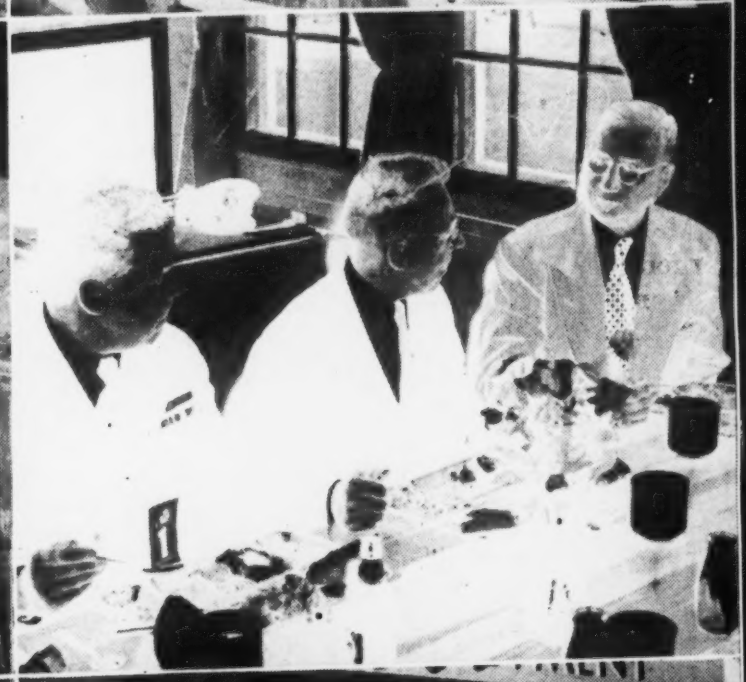
It was certainly a fitting climax to the day to be present at the review at Retreat. For a group of men who spend most of their time in classroom, the precision of that parade was nothing short of marvelous.

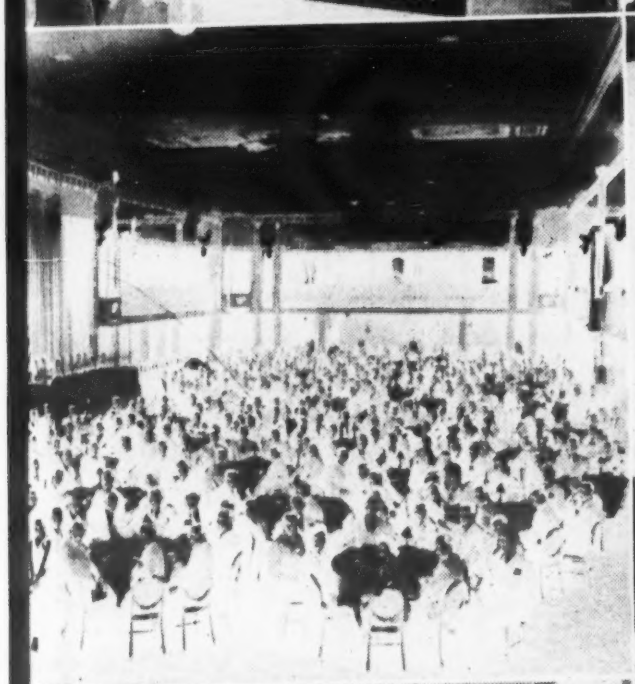
If the civilian membership of AFCA can only go a small way toward matching the competence and enthusiasm of the personnel at Fort Monmouth, I have no fear the outcome of any war. No slave state could ever hope to match it.

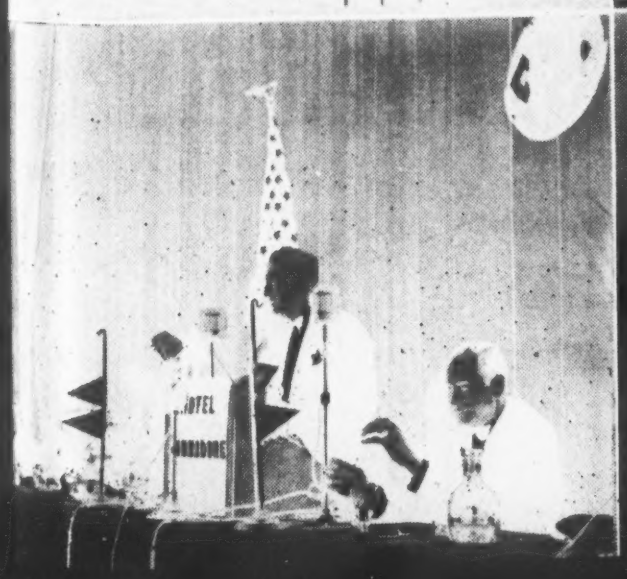
Sincerely yours,

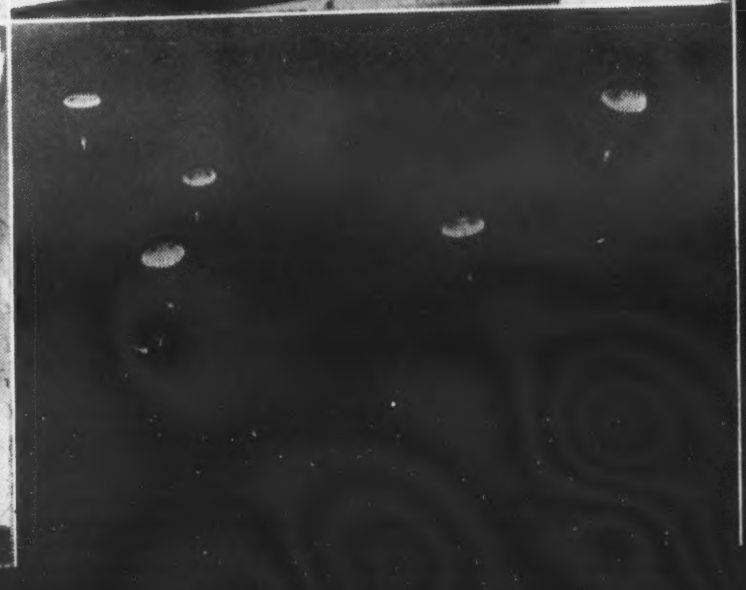
—FREDERICK R. LACK

WAR HEROES OF DISTINCTION
ARMY OR CORPS
PIGEON LOFT

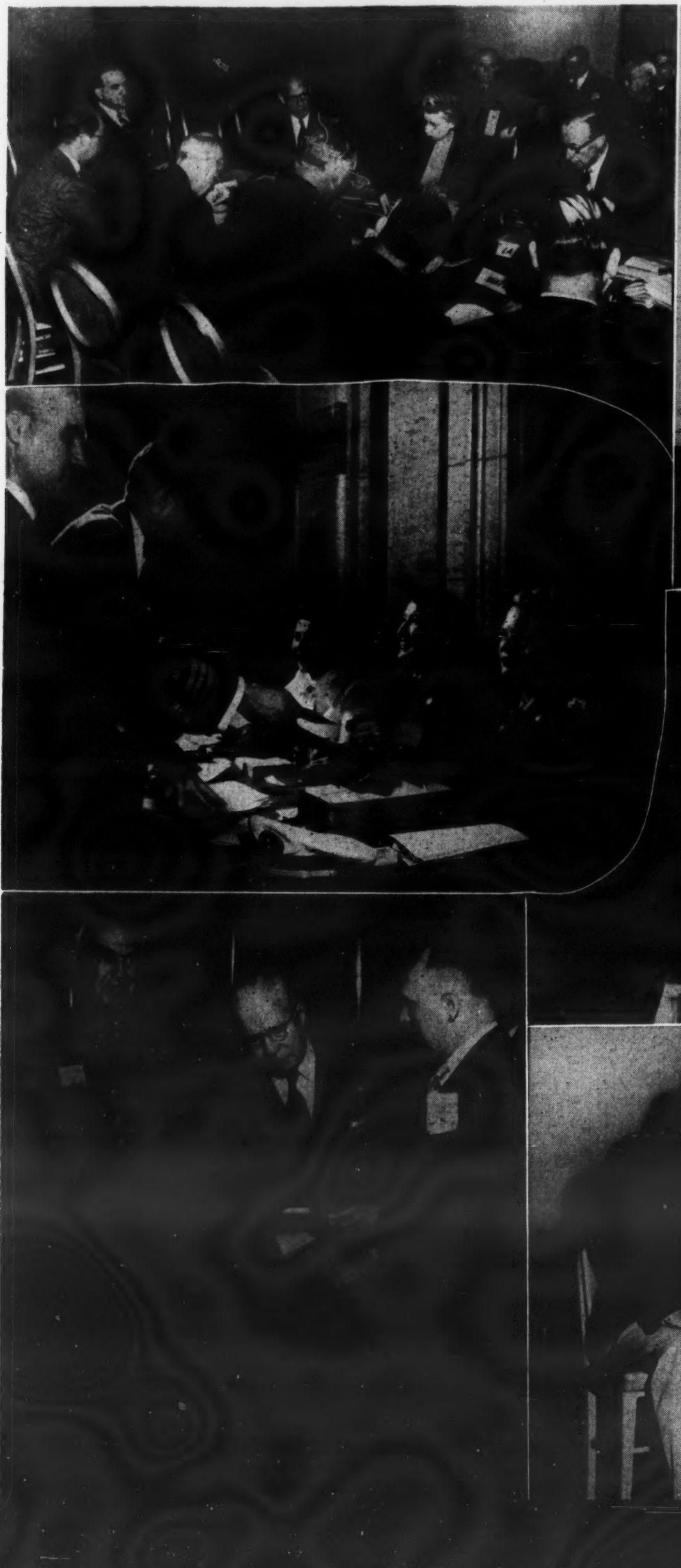








Scenes at Convention's first day, Commodore Hotel, New York, May 12, 1950. Upper left: board of directors meeting; right, AFCA President-elect Ted Gary (center) is congratulated by Philadelphia chapter president W. W. Watts while Executive Secretary George P. Dixon looks on. Center left—WACs assist in registering members; Right, Rear Admiral Earl E. Stone checks in. Lower left, Brig. Gen. Harry Reichelderfer, Maj. Gen. George Van Deusen (ret.) and Cleveland chapter president Lee Shaffer discuss program; Right, Maj. Gen. Francis Lanahan; Maj. Gen. William H. Harrison and Harold J. Bozell talk over the meeting.



Above: Eyes Right:—The state colors dip to the commanding general and reviewing party at Fort Monmouth review. Each state color was carried by a native of that state.

THE 1950 CONVENTION

Well!—it *was* the best meeting yet! "The most *constructive*, *informative*, and *interesting* convention held to date," was the way one of the chapters summed up the 1950 annual meeting in a report to its members.

Similar enthusiasm was heard expressed everywhere at the meeting, still marks many letters to national headquarters, and is encountered whenever a member is met who attended the convention. From which it appears certain that a poll of members who attended would reveal a complete unanimity in the reaction of "most constructive, most informative, and most interesting to date."

Past military shows and exhibits for AFCA conventions have been so good that it is not easy to say that the latest has been the best one. Yet it seems to have been true each year that the present one was better than the one before —and certainly it seemed the case this year. This one gave the feeling that future shows are going to have to reach high and wide to beat it!

The interest-packed day at Fort Monmouth began and ended with military activity that was thrilling to the eye—paratroop jumps and simulated combat action in the morning, a crack review of troops to wind up things in the afternoon, and in between all the wonders of the displays of Signal Corps technical advances.

But that was the spectacular part of the meeting—that day at Fort Monmouth . Equally impressive, in its own way, was the business phase of the convention, for those first day sessions on Friday the 12th at New York's Commodore Hotel, were also outstanding in AFCA history, and of those meetings it is altogether easy to say that they excelled similar previous business meetings.

There needs to be no hesitance in saying of the business side of the convention that the latest has been the best one. In that respect the 1950 meeting was unquestionably the "most constructive, most informative, and most interesting held to date." Which should be highly gratifying to all members, for the "meat" of the meeting is in the business actions taken, and the discussion provoked. And indeed at this convention the directors' meeting in the morning and the chapter presidents' meeting in the afternoon were productive of stimulating discussion which should eventually result in action of benefit to the association in its entirety —to the individual members, the group members, and the chapters.

A new president was elected at the morning business session. He is Theodore S. Gary, vice president of Theodore H. Gary & Co., and until now AFCA vice president for chapters.

Vice presidents elected were: First vice president, W. W. Watts, vice president of the RCA Victor Division; Second vice president, Rear Admiral Earl E. Stone, former chief of Naval communications; Third vice president, J. R. Cunningham, United Air Lines: Fourth vice president, C. O. Bickelhaupt, vice president and secretary of the AT&T; Fifth vice president, David R. Hull, formerly deputy chief of the Bureau of Ships, as a Navy captain, and recently made assistant vice president of the Raytheon Manufacturing Company.

Four directors were elected to the board for terms ending in 1954. They are FCC Commissioner E. M. Webster,

wartime chief of Coast Guard communications; W. H. Mansfield, of the Southern Bell Telephone & Telegraph Co.; G. F. Metcalf, chief of the electronics division of the General Electric Co.; and Joseph Wilson, president of the Haloid Co.

Mr. Gary, Mr. Watts, and Captain Hull were elected to the board to fill vacancies occasioned by the resignation of Hollywood production executive Darryl Zanuck, and the former executive secretary Brig. Gen. Stephen H. Sherrill and by the death of Dr. Frank B. Jewett, former president of the Bell Telephone Laboratories. Captain Hull's term ends in 1951 and those of Mr. Gary and Mr. Watts in 1952.

Also at the morning board meeting, Executive Secretary George P. Dixon was reelected to another term, as was AFCA Counsel Frank W. Wozencraft. Colonel Wozencraft has held his post since the beginning of the association, and Colonel Dixon took office at the first of this year.

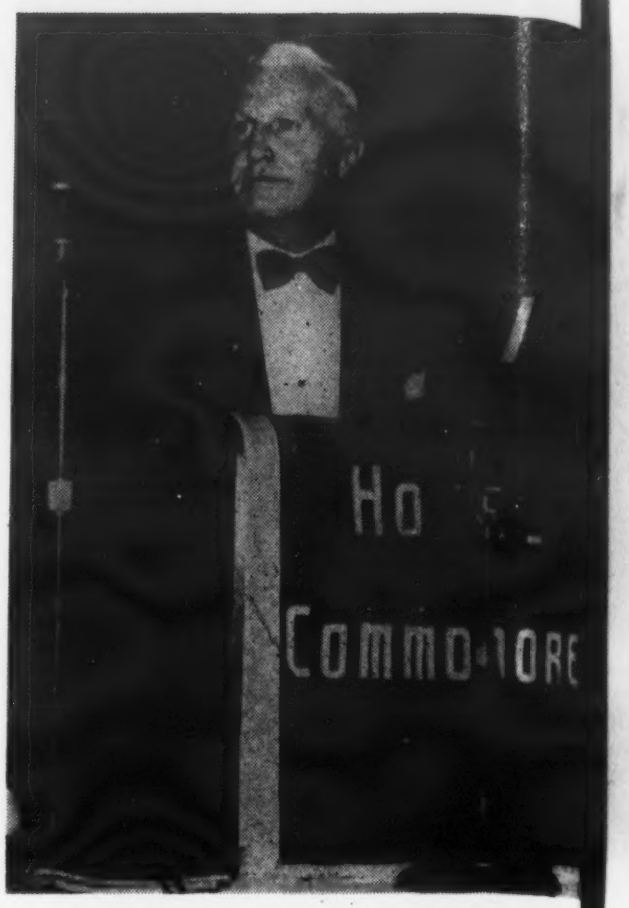
The Harrison Address

Climax of the convention's first day was the evening banquet at the Commodore Hotel marked by the stirring address of Major General William H. Harrison, president of the International Telephone & Telegraph Corporation, and wartime head of the procurement and distribution service of the Signal Corps.

In a masterful commentary on our defenes position as related to internal governmental and industrial conditions and to Western Europe's defense status, General Harrison pointed up the importance of communications-electronics now and in the future, and the "essential work of the Armed Forces Communications Association."

The IT&T president lauded the performance of communications-electronics personnel, both armed services and industry, during the late war. "The extraordinarily superb way the communications and electronics industry measured up to responsibility will always remain my great compensation in life," he stated. As magnificent and glorious sa is the war record of American arms and industry, General Harrison emphasized, "No segment measured up more adequately than did communications-electronics; no segment had men and women with greater sense of responsibility, or had more inspired leadership, more coordination; no segment produced more effective results in the cause of victory."

Touching on his recent European trip, General Harrison noted that spiritual and economic recovery in Western



Maj. Gen. William H. Harrison, president of IT&T, delivering principal address of the AFCA 1950 annual meeting.

Europe "has been spectacular," and while greatly due to self-help, there were clear indications that had there been no Marshall aid and no Atlantic Pact, conditions would be seriously different. But because great recovery has actually been achieved, with a resultant strengthening of all the Western allies, General Harrison felt convinced that "war is not imminent."

However, though there has been great general improvement, we are still involved in the battle for peace and a free world, the IT&T president pointed out, and further strengthening must continue at home. For such defense preparations, he said, manufacturers are determined and anxious to give military production right of way despite volume demand of less exacting and more profitable consumer products.

General Harrison urged that manufacture of war potential products should be in the hands of those qualified to carry on should an emergency develop. To this end he suggested that there should be greater flexibility in procurement procedures.

Much creative work is being accomplished in communications - electronics through research and development, General Harrison brought out, but more of these creations ought to be reduced to manufacture and operating practice because of the long time in field training to gain full use of the new products.

Stressing the role of the AFCA in defense preparations, General Harrison stated that the foregoing and other pressing problems "need the sound counsel of this group." He concluded with urging the members "with all the sincerity at my command to continue in the work of the Armed Forces Communications Association. for no nation can hope to survive in the world of to-

Wire laying display of new and old methods; wire is laid by helicopter, shot by bazooka and unreeled by hand.

day without military and industrial power, and without a determination by its people to remain free no matter what the price."

Banquet speakers before General Harrison were Major General Kirke B. Lawton, Deputy Chief Signal Officer; Major General Francis L. Ankenbrandt, Director of Air Force Communications; Rear Admiral John R. Redman, Director of Naval Communications; and Captain Donald E. McKay, Chief of Coast Guard Communications.

General Lawton, representing the Chief Signal Officer, Major General Spencer B. Akin, who was on an inspection tour of Europe at the time of the AFCA meeting, emphasized the current dangers to democracy, saying that "it is no secret that there is today a nation that wants destruction of religion and democracy, the conquest of the world to communism, the enslavement of the minds and souls of men, and she is making progress to this end." However, the deputy CSO emphasized, "We do not recommend war, but we believe that a cowardly fear of war and a craven spirit of appeasement will lead us to war rather than to peace."

"Until the United Nations is more effective," General Lawton pointed out, "We will have with us the question of how much preparedness we must have to prevent a war or win one if someone else attacks." Present defense preparation costs us about 5% of our national income and the maintenance of civil law and order a similar amount, General Lawton stated, and so we are paying about 10% to maintain the American way of life. However, "We cannot rest," he said, "but must now prepare to be so strong that a war will not start."

General Ankenbrandt, in his address, stressed the importance of communications in modern warfare, and for the supply of those communications a strong, prosperous, and progressive communications-electronics industry in peacetime. This strong industry in peace, he said, makes for an advantage in wartime, but can be accomplished only by the maintenance of close liaison between civilian scientists, engineers, manufacturers and operating companies and those concerned with similar activities in military, naval, and air force communications, radar, and photography.

AFCA group at first day's meeting, Hotel Commodore; L-R seated, Maj. Gen. George L. Van Deusen (ret.); Maj. Gen. H. C. Ingles (ret.); Maj. Gen. J. O. Mauborgne (ret.); L-R standing Dr. Harry Zahl, director of research, SCEL; Brig. Gen. Harry Reichelderfer; Col. James D. O'Connell, Col. Edwin R. Petzing, Maj. Gen. Francis H. Lanahan, Maj. Gen. Kirke B. Lawton and Lieut. Col. William M. Young. Men in back row unidentified.

The essence of successful military communications, emphasized the Air Force communications director, lies not in its consideration as a single entity but its compatible role in the civilian-military communications team. Only by complete dedication to its role in this team, he said, may success in all-out war be realized.

"Out of this need," stated General Ankenbrandt, "there emanated the Armed Forces Communications Association, which at the outset in 1946 was a mere embryo handful of persons, and which in four short years has grown until today it encompasses the finest industrial and military communications intelligence in the United States."

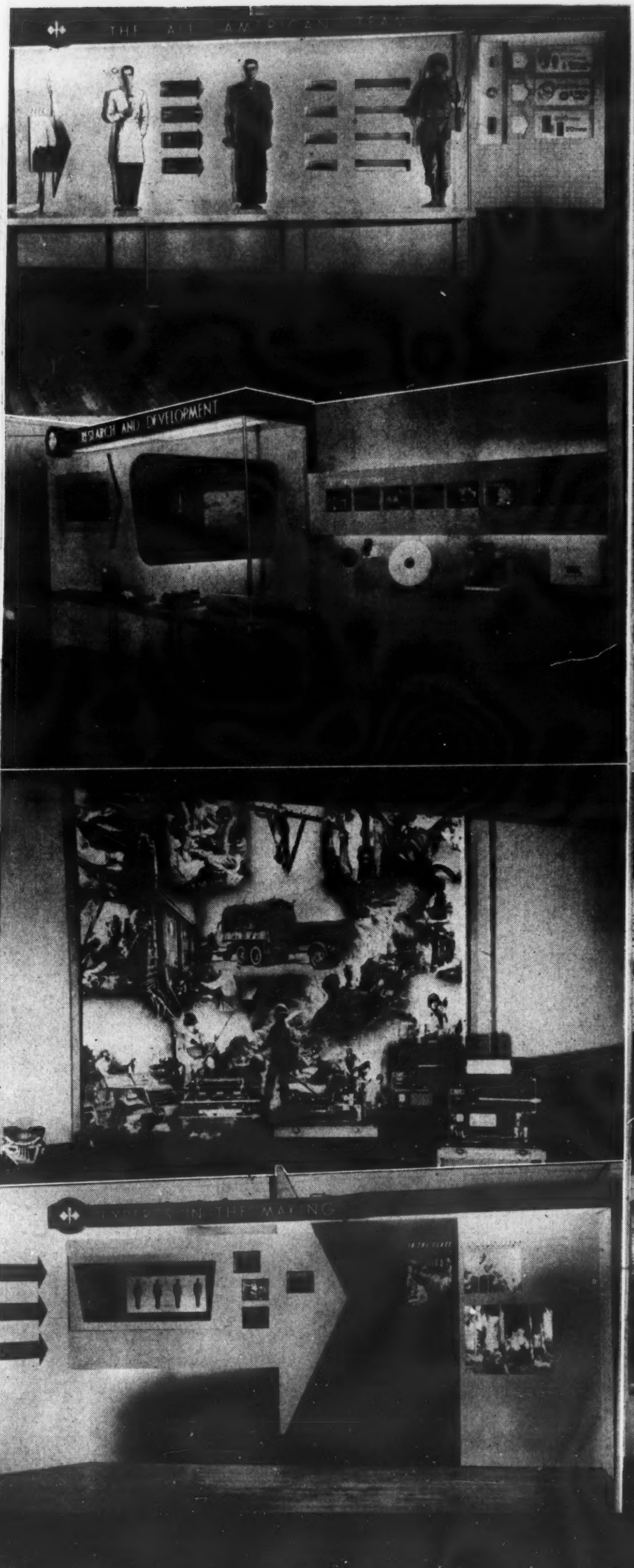
Noting with approval the progress of SIGNALS, General Ankenbrandt declared that a simple indication of the remarkable growth of the AFCA "can be seen in one facet of the organization, namely SIGNALS magazine, once unheard but now an outstanding voice in the communications field."

Rear Admiral John R. Redman, Director of Naval Communications, in his talk to the evening banquet audience declared that, "With the mutual interest and enthusiasm of its members as a basis, the Armed Forces Communications Association's contributions to our nation's defense are sure to be many. There is one direction in which I feel a particular contribution can be made—that is in the field of trained personnel. In the final analysis, people make the wheels go 'round. No matter how good the machine or equipment, its performance depends on the efficiency of the operator and the maintenance man."

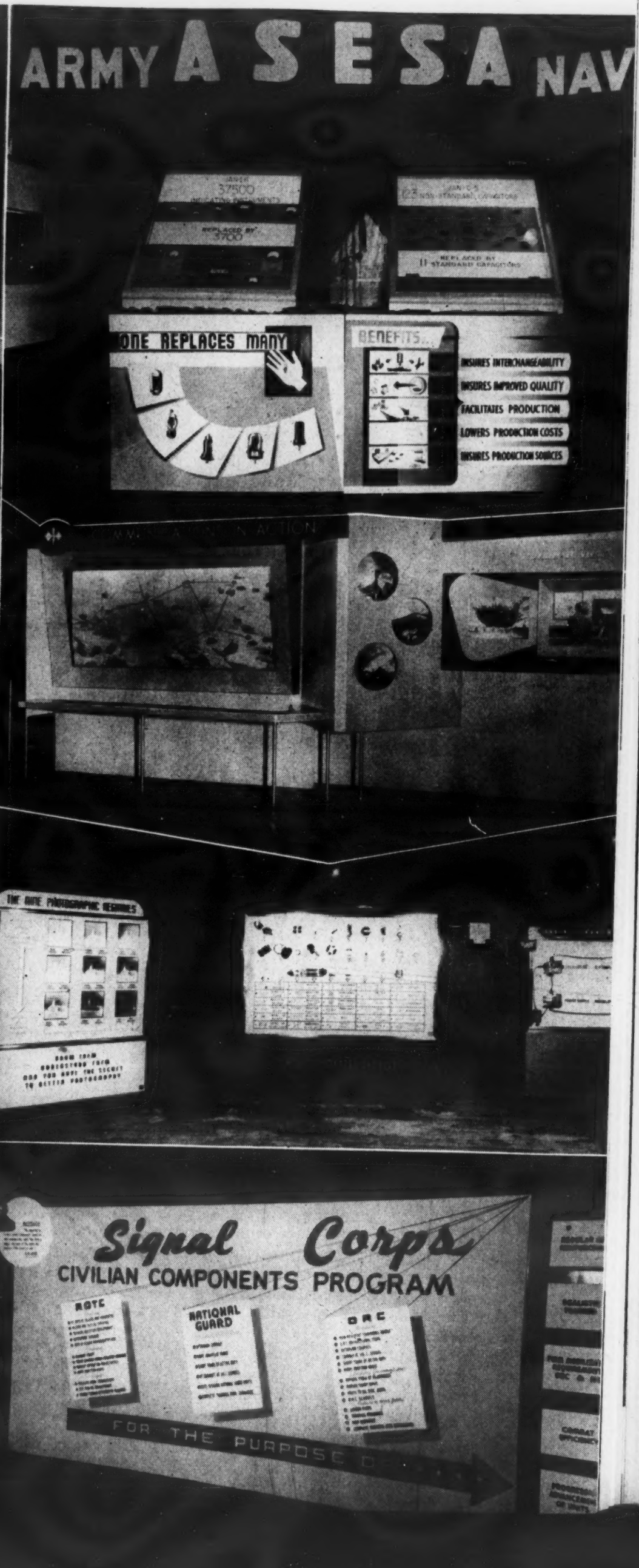
(*Continued on page* 20, *col.* 1)

AFCA fourth annual banquet, Commodore Hotel, New York, May 12, 1950.

FORT MONMOUTH EXHIBITS



for AFCA 1950 CONVENTION



New Jersey Governor Alfred E. Driscoll also visited the Fourth Monmouth displays. Bottom photo L-R: Maj. Gen. F. H. Lanahan; Maj. Gen. Edward Rose; Mrs. Alfred E. Driscoll; Mrs. F. H. Lanahan.

The chief of the Communication Division of the U. S. Coast Guard, Captain Donald E. McKay, in his address pointed up the common interest of the AFCA members—the development and use of communications in all its phases —and stressed the dependence of the Coast Guard on communications. "In the Coast Guard," he said, "efficient communications is the key to the successful execution of the many duties of this active peacetime service."

During the afternoon of the first day of the convention AFCA members not attending the business meetings visited the Signal Corps Photographic Center in Long Island City.

Movie studio of the Signal Corps, the Photographic Center produces all of the Army's training films and film strips. Military and civilian motion picture specialists at the center accomplish the production of these films from original planning and make the initial distribution.

AFCA members touring the big film plant looked in on all of the various phases of production. They visited shooting stages, animation studios, the property department, art and scenic departments, the studio carpenter shop, and the recording departments.

The sizable operation of this huge movie plant, formerly the Paramount Studios, is partially indicated by the 40,000,000 feet of motion pictures on file there.

Early the following morning, Saturday the 13th, the AFCA convention visitors set out for the journey from New York City to Fort Monmouth, N. J. for the big show of the meeting. The weather that morning, and continuing all through the day, approached perfection. Sunny and cool in the morning, it gradually warmed to become a near ideal day.

Once arrived at the big Signal Corps installation the AFCA members didn't have long to wait for the start of the day's events. With a brief pause for coffee and doughnuts the visitors moved on to the grandstands, and as soon as they were seated the show was on.

A demonstration of improved wire-laying was first on the eventful program for the day. Displaying a comparison of new and old methods, three-man team performed wire-laying as done in the first world war, while another Fort Monmouth unit demonstrated how with modern tactics 400 yards of wire is spread in ninety seconds with equipment a fraction in size of that formerly used.

Highlight of the wire laying performances was the use of helicopter over wooded areas and rough terrain. For getting across such obstacles wire is also shot by bazooka, and this method was demonstrated, too.

In a display of its diverse utility the wire-laying helicopter performed a simulated sea rescue in which a WAC officer "adrift at sea in a rubber life boat" was rescued by being hauled aboard the "egg-beater" aircraft.

With these demonstrations as prelude, Fort Monmouth began the main event — a realistic combat problem staged by Fort Monmouth troops and the 644th Heavy Tank Battalion of Red Bank, N. J. An aggressor army was attacked by tanks and infantry troops in an all-out drive. Bombs demolished the enemy's headquarters, while machine guns moved in for the kill, with signal flares denoting key positions. Spreading fires from the bombing attack routed the enemy.

Following the attack, paratroopers of the 82nd Airborne Division from Fort Bragg, N. C., made a series of jumps from two C-119 airplanes. The initial jump was made by a five-man radio relay team, followed by seven members of the 307th Airborne Engineer Battalion. After these drops eight other groups performed daring maneuvers of preci-

At AFCA review of Fort Monmouth troops, L-R: AFCA President Frederick R. Lack; Maj. Gen. F. H. Lanahan; AFCA President-elect Theodore S. Gary; Maj. Gen. Kirke Lawton; Brig. Gen. Harry Reichelderfer; Maj. Joseph O. Mauborgne; Maj. Gen. Harry C. Ingles; next man unidentified; Maj. Gen. George Van Deusen; Brig. Gen. C. O. Bickelhaupt; Brig. Gen. A. W. Marriner; FCC Commissioner E. M. Webster; last two unidentified.

sion spot landings in a small area. In the first release one paratrooper gave the audience an added thrill when a sudden gust caused him to drift over the crowded grandstand. Narrowly missing the packed stands the paratrooper landed in a tree alongside a nearby road. He was uninjured except for minor scratches, and was the only "casualty" of the landings.

The airdrops brought to a climax the morning events. After the 82nd airborne troopers had "double-timed" from the area of the drops to a formation before the stands to receive the plaudits of the audience, the morning show was ended and the AFCA visitors moved on to the regimental mess halls for luncheon with Monmouth troops.

Following luncheon the AFCA members conducted by guides through the large exhibits on which Fort Monmouth personnel had labored so long and strenuously in preparation for viewing by the convention visitors.

Most of the vast array of latest developments in communications-electronics-photography were set up in circus-type tents spread over a great area near the post athletic field. Other exhibits were the Signal Corps' trailer mobile displays of radar and communications equipments, and the exhibit "Your Signal Corps in Peace and War," which was set up in the post's service club.

The latter exhibit, in which the Signal Corps justifiably takes great pride, received its official unveiling and premiere at Fort Monmouth on AFCA day. The exhibit is a sort of illustrated history of the Signal Corps, the illustrations consisting of dioramas and photographs, in a series of displays which includes: Early Days (of the Signal Corps); Research and Development, rockets with the latest electronics-communications devices within the rocket; Expert In The Making, how soldiers are picked for the Signal Corps, and trained; All American Team, since, industry, and the Signal Corps working hand in hand; Communication in Action; Eyes Of The Army, photographic developments and activities; Television.

The AFCA groups were conducted through this exhibit by WAC guides

Text of speech delivered by Major General William H. Harrison, president of the International Telephone and Telegraph Company, at the AFCA 1950 convention banquet, May 12, Commodore Hotel, New York.

Seeing so many familiar faces brings back fond memories, and prompts me to say that of the many compensations I have had in life none has given me greater satisfaction than the associations and friendships growing out of the war years.

Many of these associations were with those in uniform—but many more were with those who carried on in equally essential, but less rewarding work in industry.

Some of these associates died mortal death, and we revere and respect their memory. And during those trying years, it seemed to me countless numbers faced death a thousand times as they worked and prayed for their loved ones off at distant fronts.

I also want to make the observation that magnificent and glorious as is the war record of American arms and industry—

No segment measured up more adequately than did communications and electronics.

No segment had men and women with greater sense of responsibility.

No segment had more inspired leadership—more intensive coordination.

No segment produced more effective results in the cause of victory.

And with due modesty, I suggest that you men here tonight symbolize the hard core of those who made this magnificent result possible.

Satisfaction in this personal association, and conviction as to the extraordinarily superb way the communications and electronics industry measured up to responsibility, will always remain my great compensation in life.

I do hope you share some measure of this satisfaction and long ago put out of mind the trying, difficult and frequently painful ordeals many had to go through.

Perhaps I make this observation because of the guilt on my conscience growing out of what had to be extracted from some sitting nearby.

And now after a lapse of some four to five years it is a further tribute to your sense of responsibility that you see fit to continue in this essential work of the Armed Forces Communication Association.

It is clear you full well realize the significance of electronics and communications in the troubled world in which we live.

There is so much mystery—so much complexity in this whole field of electronics, I don't think man possesses the boldness or the imagination to indicate the path which must be roughed out to create the facilities necessary should there be another all-out call to arms.

True, our universities—our military and industrial laboratories—engineering staffs—all are everlastingly at research and at improvement. Much creative work is being done and appliances and techniques far beyond my understanding are being brought into sharp focus.

The necessity to be ever on guard against surprise—unpredictable weapons—total disregard of civilized morals and ethics impels never-ending study and research.

But more of these creations ought to be reduced to manufacture and more importantly to operating practice. We all know from experience the long time in field training and field operation to gain full use of present-day electronic products.

Right now industry is in that fortunate situation where production is exceeding all peacetime levels and where demand for products exceeds supply. Nonetheless manufacturers are determined and anxious to give military production right of way despite volume demand of less exacting and more profitable consumer products.

It seems essential manufacture of war potential products should be in hands of those qualified to carry on effectively should an emergency develop. And to do this I suggest there ought to be greater flexibility in procurement procedures, otherwise there may not be full development of industrial war potential.

In the final analysis military expenditures are in anticipation of the uncertainties of the future, and are to ensure that both the armed forces and industrial forces of the Nation are geared to meet whatever the future may thrust upon them.

(*Continued on page* 23, *col.* 2)

who served as narrators. The exhibit was enhanced by the manner and excellent delivery of these young ladies. Considerable credit should be accorded them. We have, however, only the name of the guide for our own group. She was Private Maria Marotto of Malden, Mass.

The "Your Signal Corps in Peace and War" exhibit has since gone on tour. During the last part of June it was set up in the main concourse of the Pentagon at Washington, D. C.

It would take all of the space in SIGNALS, and more, to do justice to all of the of the exhibits shown at Fort Monmouth for the AFCA visitors. A few of them were as follows:

Guided Missile Display, depicting an actual Aerobee rocket nose cone which was fired last December to collect air samples, and a mock-up of the experimental equipment used to measure air temperatures in the stratosphere. In this later experiment nine grenades are ejected, one every four seconds, from the rocket during flight. By determining the exact time and location in space of each grenade burst and by picking up the time of arrival of each burst on the ground, the mean temperature through the atmospheric layers between grenade bursts can be determined.

Radar Set AN/TPQ-6 is a meteorological instrument used in the determination and recording of the heights of cloud layers directly over the equipment.

RAWIN Set AN/GMD-1, an automatic radio direction finder in the 1600 megacycles band. It automatically tracks a balloon-borne radiosonde, the AN/AMT-4, to altitudes of 100,000 feet over horizontal distances of 125 miles.

Radiosonde AN/AMT-4, the principal device used today to probe the upper atmosphere.

Radio Set SCR-658, a transportable manually-operated receiving-type meteorological radio direction finder. Enables calculation of upper wind velocities from angular data obtained by tracking a small balloon-borne radiosonde.

Wiresonde Equipment AN/UMQ-4, used to obtain temperature and relative humidity in the lower 1,000 feet range of the atmosphere. It is portable, completely self-contained, requiring no outside power source.

Air Supported Radome, a nine foot diameter truncated spheroid for Arctic use which incloses and protects the antenna of the SCR-584. The fabric is a neoprene coated two-ply fortisan rayon having a total thickness of seventeen thousandths of an inch. The shape of the radome is maintained by means of a small blower.

Radiation Detection Instruments, for detecting and measuring nuclear radiations. Three methods were exhibited: a. The scintillation or crystal counter employing a crystal of anthracene as **the detecting element. b. The Geiger** counter, detecting element of the Signal Corps Radiac Set AN/PDR-T2. c. Radiac Set AN/PDR-T1 uses an ionization chamber as the sensitive elements for detecting radiation.

Components, Materials, and Miniaturization. This exhibit demonstrated the progress and recent developments in these fields developed under Signal Corps contracts. Among the components shown were miniature resisters, capacitors, and circuit breakers which are electrically superior to the units they are replacing and physically much smaller. Also shown were hermatically sealed glass capacitors, and R-F connectors which can operate under high humidity conditions, and new synthetic

Photographic activities at meeting. Shooting of a training film is demonstrated and (lower) SigCorps cameramen film AFCA banquet at Commodore Hotel.

materials in the plastics group to support this overall program of weight and size reduction and simplification of the processes of mechanization of production and manufacture.

Surface Wave Transmission Line, or G-string. A new type of transmission line which employs a single conductor with a dielectric coat and a couple of conical horns.

Simulated Snow Village, scale model of the climatic test laboratory of the Signal Corps Engineering Laboratories.

Tropical Test Box, diorama of tropical island, depicting a landing, and conditions of extreme humidity and heat.

Type A Transistor High Frequency Crystal Oscillator, demonstration model of a miniature, low-powered, radio frequency transmitter utilizing no vacuum tubes.

President-elect Ted Gary with group of Bell System men, L-R: Raymond B. Meader, Ralph S. Grist, Mr. Gary, Fred M. Fister, Hugh A. Fleming and George P. Dixon.

Synthetic Quartz, exhibit.

Photography, new equipment and methods. New cameras. Electrophotography system which does not require film, water, or solutions of any kind. Stereoscopic Viewer, three-dimensional photography for tactical purposes.

New Dry Cell Batteries. A new line developed at SCEL.

Television. A system miniaturized for military use to be used in airborne and vehicle installation for reconnaissance.

Teletypewriter. Old and new models. Latest equipment is rugged, lightweight, smaller in size, with a considerable increase in word-per-minute speed. The usual DC teletypewriter pulses are converted into frequency shift signals suitable for transmission over any voice frequency facility, wire or radio.

Wide-Page Facsimile. The equipment exhibited was designed for a simultaneous study of wide-page facsimile techniques and of high speed terminal equipment and transmission problems. The page size, largest transmitted by a facsimile system, is nominally 32" by 40".

Field Radio Equipment. The Handie-talkie set AN/PRC-6, the larger back-carried set AN/PRC-10, and the largest set AN/GRC-3 for vehicular operation.

Telephone Terminal AN/TCC-3, new lightweight carrier equipment used at one terminal of a telephone carrier system making it possible to carry on 5 conversations simultaneously over a special lightweight field cable containing 4 wires, for distances up to 200 miles.

Switchboards. New lightweight field switchboard weighs only twenty-two

Gen. Harrison Speech

(*Continued from page* 21)

I am mindful of the conflicting considerations which bear on sound solution of these procurement problems, but I venture that the values inherent in having manufacturing responsibility with proven organizations in the field are not given proper recognition.

Much as I am tempted to spell out these and other pressing current matters that face government and industry in this field—and they need the sound counsel of this group—I am going to discuss other matters.

In 1941 this nation announced to the World that we wanted peace and a world free from aggression. In support of this principle and with our allies we fought and won a superlatively expensive war on two sides of the globe.

The battle for this principle still goes on, and a tremendously burdensome price.

Added to the material cost is the disturbed, tense and apprehensive mind of America.

We seem caught in the grip of world happenings. We no longer shape our own destiny. Day-by-day, incident-by-incident, morally—economically—militarily our position of leadership in world affairs becomes more real and more fixed, and further involves us in global events.

And to digress for a moment—when you reflect on the high moral and humane plane this Nation is discharging the responsibility events have imposed—restrained pride in belonging to such an enlightened land—hardly can be kept in bounds. Wise as it is to restrain one's pride—sometimes it is healthy to let loose mounting pride in being an American.

But responsibility, as in all affairs, limits freedom of action.

Let us illustrate—we all recall the battle of words and appropriations over what forces and what arms should go to make a balanced military program.

A few days ago our distinguished and world respected Chief of Staff, General Bradley, suggested "even our own balance of United States forces may have to give way to the theory of national specialization." In other words much as we debate the balance of our own forces we do have to recognize balance with respect to availability of the forces of our Western friends. This is only one illustration—many others will occur to you.

As individuals most of us resent the trends we see developing, for we are fearful of the possible consequence; we dread even the thought of another war for we cannot dismiss from mind the horror bound to come from it.

Against this background of concern, day-to-day happenings are irritating—we are prone to insist such happenings grow out of unfortunate or inept handling by government authorities.

More and more, and it seems to me sometimes with more heat than wisdom, we debate whether this or that government department is serving the Nation's

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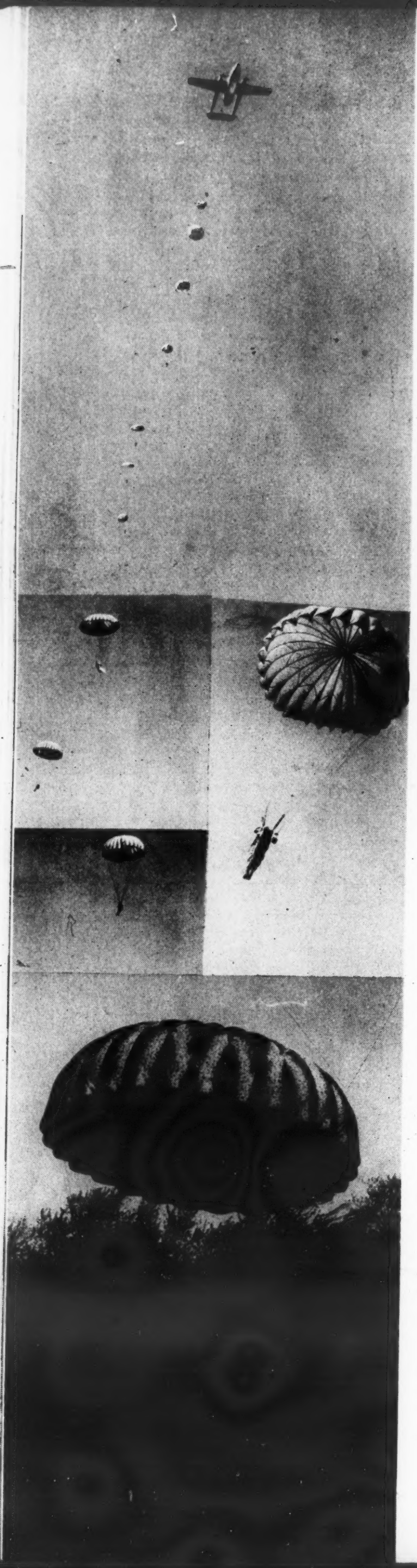
AFCA visitors lunch with troops in regimental mess at Fort Monmouth.



82nd Airborne Division paratroopers float to earth before AFCA audience—Fort Monmouth.

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pounds and may be stacked one above another and side by side to provide a workable telephone exchange up to 58 lines in capacity. This new switchboard, SB-22( )/PT, provides means of integrating telephone and voice frequency telegraph circuits with radio equipment to form a communication network.

Recorder-Reproducer RD-74( )/U, a medium fidelity magnetic tape type recorder-reproducer for general military use for recording the outputs of microphones, wire lines, or radio interceptor receivers and playing back the recorded tapes as often as necessary.

Sound Recording Set AN/UNQ-1B, a highly portable micro-grooving type recorder-reproducer by which sound recordings up to two hours duration may be made.

Wire and Cable. Display, contrasting new and old. New wire uses lighter insulation, is 1/3 the weight of the old, yet gives about 20% greater talking range. New dispenser eliminates steel reel, contains half-mile of wire which pays out without rotation of package, and communication may be maintained during payout. New Spiral four type cable is smaller, lighter in weight, more rugged, and capable of transmitting 4 or 12 telephone conversations.

Radio Interference Suppression Cyclorama, exhibit, visually and aurally demonstrates the necessity for and method of reducing radio interference.

Exhibits to Review

These and many other exhibits made a full three to four hours of touring for the AFCA members. And at that there was little time for close examination of each display. There was also the teletypewriter section of the Signal School, in which the visitor saw how a student progresses from his beginner's status when he first sees a large mockup of the working parts of a teletypewriter, until he is actually working on the machine itself; and the "phone vision" in which the persons conversing on a telephone connection can see a televised image of each other; and a MARS amateur station in operation, over which the visitors could send messages to any place in the United States, and the mobile exhibit of communications and radar; all these, and many others displays.

There was no pause between all the viewing of exhibits and the review which ended the afternoon's activities. From the exhibits area the AFCA guests moved directly to the stands to see 10,000 Fort Monmouth troops pass before them in review.

As a warmup to the review a crack drill squad entertained the visitors until the command "Pass in Review!" rang out. The review itself was superb. As President Lack commented in a letter

Gen. Harrison: I urge you with all the sincerity at my command to continue in the work of the AFCA.

Gen. Ankenbrandt: The AFCA . . . a mere embryo handful of persons at the outset . . . has grown until it encompasses the finest industrial and military communications intelligence in the U. S.

to the Fort Monmouth commanding general, Major General Francis Lanahan, "for a group of men who spent most of their time in the classroom the precision of that parade was nothing short of marvelous."

(*See page 21 for photo and list of reviewing party.*)

The review brought a glorious finale to the AFCA 1950O annual meeting—a meeting which in advance announcements had been promised to be "the best yet," and had lived up to the promise.

A dinner dance at Gibbs Hall followed the review, in the evening, and gave the AFCA guests the opportunity to relax and talk over together the accomplishments of the convention. And much had been accomplished, it was agreed by all.

Business Meetings

The business meetings of the preceding day might well take a place in AFCA history which in some distant retrospect may be regarded as the real beginning of AFCA growth. For at these meetings the facts of the association's actual condition were laid out for examination, for all to see, so that anyone who chose might ask *what are we?—where are we— where are we headed.* This unequivocal approach, it can be held, played a large part in opening the way for the lively discussion which marked both the directors' and the chapter presidents' meetings.

Principal source of the facts was AFCA Executive Secretary George P. Dixon's report which was read at the morning meeting, following the election of officers and directors.

The report opened with an accounting of the status of chapters. In a comparison of the present standing with the past, Col. Dixon, stated that while twenty-nine regular chapters and six student chapters were carried on the records at the close of last year, nine regular and four student chapters were then partially or completely inactive. Since January 1950 two regular chapters, Boston and San Francisco, have been reactivated, and five others have indicated definite renewed interest. These latter are Richmond, Dayton. St. Louis, Dallas, and Odgen-Salt Lake. Two chapters have been dropped—Spanish War Veterans and Rio de Janerio.

New regular chapters, Col. Dixon's report went on, are shaping up at Rochester, N. Y.; Denver, Colorado; and Portland, Oregon; where contacts have

been established, and also several others in the central and north-central section of the country.

As to student chapters, interest has been revived in the entire ROTC field. A new chapter has been chartered at Utah State College, and several other school chapters are indicated.

The Executive Secretary reported that since taking office he had been present at eight chapter committee meetings and that he hoped to visit all Stateline, chapters this year, including those inactive ones showing renewed interest.

In a recapitulation of membership figures, Col. Dixon reported that a high of 6800 had been reached in 1947 and that this figure had steadily declined to a low of 4100 during the latter part of 1949. Since the first of 1950 the trend has reversed and a steady gain has set in, so that at the time of the report made at the convention there was an active paid-up membership of about 4500. (*Ed. Note: The steady gain is still being made, and the total is increasing daily*).

The group membership had also attained its high level in 1947 and had since fallen off. (Pointing up this fact led to considerable discussion during the business meeting as to methods of putting on a drive for new memberships of this type.)

Future Actions

On plans for the future, the Executive Secretary voiced the hope that after rehabilitation work had been caught up with that National Headquarters more time could be given to concentrating on the great potential membership in industry, both in manufacturing and operating fields. Col. Dixon stated the belief that the AFCA is needed nationally and that we have an opportunity to become an important part of the National Security effort. But in order to effect AFCA expansion, he said, the wholehearted support of the national directors and of the chapters is needed.

Speaking of the association publication, Col. Dixon pointed out that SIGNALS is the thread that holds together the interest on our association, that it is widely complimented in its present form, but that he hoped to publish it on a monthy basis in the near future so that association and chapter news could be made more up-to-date in published reports.

In the business discussion which followed the Executive Secretary's report it was agreed by the board that SIGNALS should be published on a monthly basis

Video-Telephone exhibit at Ft. Monmouth. WAC Pfc. Dorothy Burrus holds telephone conversation with Cpl. James Rheade, whom she can see on television.

Gen. Harrison Speech

(*Continued from page* 23)

best interests—we debate the level and type of military expenditures—we debate the actions of the State Department—handling affairs with the Soviet as they impose their ruthless and brutal disregard for the dignity of human rights—and so it goes.

And we completely lose sight of the fact that there is a long lapse of time between cause and effect. Clearly our trials and troubles of today grew out of events and policies formulated many years ago.

Of course, all of this discussion is healthy within ourselves—but by the same token freedom to debate our own issues must place our government representatives in poor light and must restrict their effectiveness.

Your individual thinking can be a real force for constructive good in these affairs and I urge, without in any way sacrificing political and economic views, you give support where you can to our government officials who are so sorely tried these days.

Before finishing, and because world peace and the destiny of Western Europe are one, I am going to make an observation about Europe.

I have been abroad several times recently and during the past two weeks travelled from Copenhagen—to Amsterdam—the Hague—Antwerp—Brussels—Paris—London.

People go about their accustomed ways—school teachers mother school children to libraries—to parks—watching faithfully over them as they cross streets—factory workers hard at their tasks—farmers walking to their villages at the end of a long day's work—green and bountiful farm—fields of tulips in bloom.

Spiritual and economic recovery has been spectacular and to a degree far exceeding any realistic appraisal of what was to be expected in so short a period of time. Much of this comes from self-help, although I shudder to think what might have been had there been no Marshall aid and no Atlantic Pact.

You marvel that all of this is as it is, with the brute force of an aggressor just beyond their boundaries—and seemingly no force present to stop them.

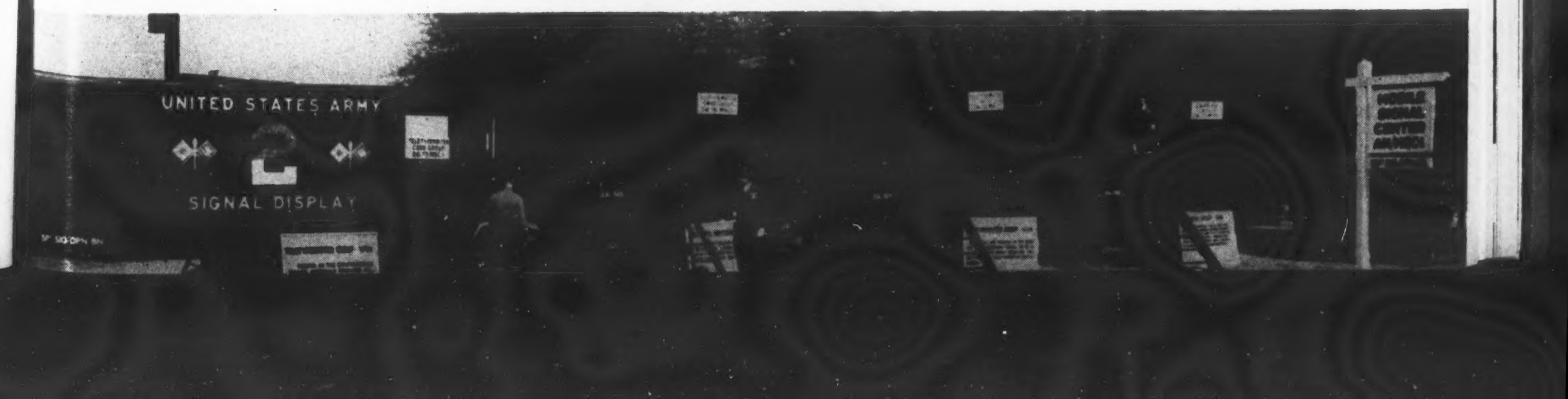
As you observe all of this—a feeling of confidenec comes to you, and strangely, concern over what may happen becomes less acute. Confidence and faith in the future more and more take control of your thoughts.

True, one can never dismiss the distinct possibility of war. The Western powers must be prepared to meet war. On the other hand, in a layman's way, as you appraise strengths and weaknesses, you find comfort in the knowledge of the brute force possessed by the Western allies, and more particularly the determination to use brute force in the cause of free men everywhere.

But above all else you are certain there is the determination of free men to stay free.

All of this adds up to the conviction I have, war is not imminent. Nonetheless, I urge you with all the sincerity at my command to continue in the work of the Armed Forces Communications Association, for no nation can hope to survive in the world of today without military and industrial power, and without a determination by its people to remain free no matter what the price.

Mobile Exhibits at Fort Monmouth.



Maj. Gen. F. H. Lanahan escorts Francis Cardinal Spellman on his arrival at Fort Monmouth. Right: Cardinal Spellman and visiting clergy view exhibits.

as soon as it is feasible. Mr. E. K. Jett suggested that it first should be made certain that it will be self-supporting. General Lanahan proposed that "the board of directors pass the problem to the executive committee to start the magazine on a monthly basis if and when fiances permit." This action was approved by the board.

Constitution Changes

Action also was taken by the directors concerning the publication effected a slight change in the title. On Secretary Dixon's suggestion that "SIGNAL" would be preferable to "SIGNALS" since it would better include all armed services and would carry more general significance, motion was made and passed that authorization be given to drop the final "s" in the present title, making it SIGNAL.

President Lack opened the morning business discussion with comment on the association's financial condition, pointing out that with the present increase in membership we can continue to function as we are doing now, but that further increase is necessary and that everyone must lend a hand in realizing these increases.

Consideration was next given to the proposed revision of the constitution and by-laws. The suggestion was made by Counsel Wozencraft that the fiscal year be changed so as to end on March 31st. in order that the report of the Executive Secretary could be made at the annual meeting. The change was approved by the board.

(*Further proposed constitution changes need not be listed here since a copy of the constitution with changes was mailed to each member.*)

One action taken at the board meeting will result in financial aid to several of the chapters which are not in manufacturing areas. Secretary Dixon made mention of a suggestion from William Harrington, AFCA Area "A" representative that the total of group member dues quotas to the chapters should be pro-rated among all the chapters, rather than having chapter portions of these dues go to chapters within whose territory the group members happen to be. President W. W. Watts of the Philadelphia chapter made the motion that this suggestion be incorporated as an amendment The motion was seconded and passed.

Discussion on what the AFCA might do for group members developed out of Secretary Dixon's statement that he needed the advice of the directors on that and other matters.

Industrial Meet Proposed

President Lack suggested that, "Perhaps we ought to hold special group sessions at which armed services' communications problems are discussed with industry. The armed forces counsel with industry, but never so far as I know get a communiciations group around a table and lay out their problems on a broad basis." The outgoing AFCA president further suggested that it might be possible at the annual AFCA meeting to set up certain days on which all three armed services could have their particular meetings and tie them all in with the convention. He expressed the belief that the Government would get a lot out of it.

General Lanahan followed up with the suggestion, "Why not set up a series of meetings where these problems can be presented in the morning and afternoon while the business meetings are going on?" Secretary Dixon added to this the thought that if next year's meeting is to be an industrial conference, as has been proposed, the idea of panel discussion would work out very satisfactorily.

Suggestions were also made that subjects be set up on which the services and industry would present problems to the panels, and also that since most operating and maintenance companies have training problems and that each new piece of equipment as it comes out opens up a whole new series of problems, panels could be set up on training to handle such equipment.

The chapter presidents' conference was called to order at 2:00 P.M. Theodore S. Gary, vice-president in charge of chapters, and president-elect of the association, presided.

L-R: Herbert J. Schroll, N. Y. Telephone Co.; Maj. Gen. F. H. Lanahan, Al Tradup, Bell Telephone Laboratories; Maj. Gen. F. L. Ankenbrandt, director communications, Air Force.

End of the convention — during the evening of the last day AFCA guests at Fort Monmouth gather for cocktails at Gibbs Hall to talk over events of the meeting before the dinner-dance of that night. Photo 1. Lt. Col. A. F. Cassevan; FCC Commissioner E. M. Webster; Brig. Gen. Harry Reichelderfer, CO, SCEL; 2. Harry E. Austin, president San Francisco chapter; Lt. Col. Henry J. Hort, Camp Gordon chapter; Col. James D. O'Connell, Ft. Monmouth chapter; 3. Maj. Gen. F. H. Lanahan; Harry E. Austin, San Francisco chapter; Maj. Gen. Kirke B. Lawton, Deputy CSO; 4. Relaxed delegates enjoying cocktails. 5. Maj. Gen. F. H. Lanahan; Col. George P. Dixon, Executive Secretary AFCA; W. W. Watts; Harry E. Austin; Maj. Gen. Kirke B. Lawton; Lt. Col. Henry J. Hort, Pres. Augusta-Camp Gordon chapter; Oliver Read, Pres. Chicago chapter; Col. J. D. O'Connell; 6. Robert McElroy, Pres. Detroit chapter, Mrs. McElroy, Col. E. A. Kenny, Ft. Monmouth chapter; 7. Lt. Col. Henry J. Hort, Fred Fister, Pres. South Carolina chapter; Theodore S. Gary, President-elect of AFCA, Hugh Fleming. 8. L-R: Dr. J. O. Jerrine; Gen. Lanahan; Col. Harrod Miller; Col. Fred Miller (ret.).

Mr. Gary, in his opening remarks, reviewed the aims and purposes of the AFCA and quoted a statement from the joint communications-electronics committee of the joint chiefs of staff to the effect that "the committee whole-heartedly endorses the purpose of your association. . ."

Chapter Discussion

Discussion developed during the afternoon meeting on matters as follows. Revision of national constitution and by-laws; Advisability of change in name of association and magazine and insignia; Cost of SIGNALS and question of publishing monthly; Reduction in classes of membership (action at the directors meeting eliminated the retired and associate membership fees); Use of Standard chapter stationery; Assignment of some members at large to chapters extension of chapter areas; Expansion of large and small group memberships (This developed into lengthy and beneficial discussion); Types of successful chapter meetings (also considerable discussion developed here too out of which came excellent suggestions); Chapter Constitution and By-laws; Chapter officers and committees (under this subject the matter of publicity was dwelt on, during which President Lack pointed out that part of our job is to publicize communications-electronics and its importance to national defense and that the more news in papers the better for the Association); Student chapters; sub-chapters; Chapter finances and distribution of group dues quota; Content of SIGNALS (The editor being present at the meeting stressed that suggestions on content are always welcome and are generally acted on—whereat General Lanahan followed with the suggestion that reprints of interest from foreign journals be published); Reports and photos of chapter meetings; Chapter of the Year contest; Chapter guide.

At the afternoon meeting President Lack presented certificates to the Chapter of the Year contest winners. President Henry J. Hort and Past-President Hugh A. Fleming accepted the award on behalf of their first-place chapter, Augusta-Camp Gordon. For the runners-up Mr. Gary accepted on behalf of the Sacramento Chapter, which was not represented at the meeting; President Oliver Read for the Chicago Chapter; Vice President Eugene Stern for the Pittsburgh Chapter, and President J. D. O'Connell for the Fort Monmouth Chapter.

Meet Indicates Bright Future

Space will not allow more than the foregoing summary, and in some particulars merely a listing of subjects, of the morning board meeting and the afternoon chapter presidents' meeting. But both sessions brought out comment and ideas which displayed the vigorous intelligence which marks the AFCA membership and which, seen in action, leaves no room for doubts as to the brightness and strength of the association's future.

So—we look back on the meetings of the first day of the convention; the inspiring messages of General Harrison and the service communications chiefs, renewing our faith by restating so brilliantly our purposes; the magnificient military show and displays at Fort Monmouth the second day; and we known that indeed the meeting was The Best Yet!

COMMUNICATIONS CONTROL of Special Mission and Long Range Aircraft

By Lt.Colonel Philip A. Gugliotta, USAF

"AIR FORCE B-74 BREAKS NON-STOP RECORD WITHOUT REFUELING."

This headline appearing in all syndicated newspapers on the morning of August 12, 1950, would cause much excitement around the world, especially with the air-minded populace of the United States.

These enthusiasts may be somewhat surprised to learn that the plan to build an airplane of the B-76[1] type was first made known by military planners four to ten years ago. During that span of time, "much water passed under the bridge."

With so much time and many millions of dollars invested in the development and production of this aircraft, which was ultimately to prove to the world that "Air Power Is Peace Power," a vital counterpart of the B-76 has not been given equal treatment.

That running-mate is *radio communications facilities to guide and control* this multi-million dollar arsenal through the the skies above.

Why More Speed Needed

This article will first outline a few reasons why communications control and guidance of the future must be speedier than at present; then to emphasize the current inadequacy, a "blow-by-blow" description of how communications served this record-breaking B-76 flight; and in conclusion, will set forth a technique that could have been followed so as to meet current operational requirements.

Communications control and guidance consists of those procedures and facilities utilized by communications technicians to afford the Air Force commander with continuous information as to the whereabouts and status of his aircraft, and communications channels which will permit him to transmit and receive instantaneous operational data.

[1]Any relation to a current or future development is non-intentional and strictly coincidental.

As stream-lined automobiles have replaced the horse and buggy on the streets of villages and cities, so must there be developed a new concept in the radio communications field to keep in step with the current and future tempo of military aircraft operations.

The present and past concept, communications-wise, tolerates message delays of thirty minutes or more in the processing and transmitting of operational data to and from airplanes in flight. With the advent of jet-propelled aircraft flying at speeds greater than 600 miles per hour, the tolerable time factor must be reduced to a very few minutes or even seconds.

Flight Preparations

Picture, if you will, a jet airplane flying from Dayton, Ohio to Seattle, Washington, at 600 miles per hour; when the aircraft nears Chicago, the weather bureau issues a warning to the effect that a serious thunderstorm has developed 200 miles west of Chicago. If instructions cannot be put into message form, transmitted to the airplane. acknowledged by the pilot, within a period of 15 to 20 minutes, they would be of no value because the danger area would have been reached.

Aircraft operations and missions can only be as efficient as the radio communications used for their guidance and control. This can be analogous with a blind man without a seeing-eye dog, or a deep sea fisherman in the middle of the Atlantic in a canoe.

Let us take a ringside seat on the planning and operation of the record-breaking flight portrayed in the newspapers of August 12, 1950, and then depict the refinements, communications-wise, that could have been employed to effect economy, security, and speed of message transmission.

The B-76 was to depart from McDill Air Force Base, Tampa, Florida, at 0800 some morning during the second week of August 1950, and arrive in Tokyo, Japan, fourteen and one-half hours later.

Several weeks before the giant aircraft embarked on this adventure, telephone and teletype wires were literally humming with instructions to all concerned. These instructions had to be closely guarded to eliminate speculation by the public or others not directly concerned with the project.

In view of this, all messages transmitted by electrical means (radio, teletype, and telegraph) were encoded or enciphered. Similar instructions were hand-carried by airplane couriers to interested military organizations within the United States.

The organization having the bulk of responsibility for the safety and welfare of a mission of this type is the Military Air Transport Service (MATS). Upon receipt of the itinerary by headquarters of MATS, a conference was held with representatives of its Service Units—Air Rescue Service, Military Flight Service, Air Weather Service, and the Airways and Air Communications Service.

MATS Service Alerted

These services in turn issued instructions to their subordinate units. Air Rescue Service alerted all search and rescue units stationed along the path of the flight. Flight Service did likewise. Subordinate weather stations of the Air Weather Service were requested to be prepared to issue special weather forecasts and observations. Airways and Air Communications Service (AACS) informed its Continental Wing of the contemplated mission of the B-76. These headquarters passed amplifying instructions to their subordinate groups, squadrons, and detachments, dispersed along the route.

In short, these communications instructions directed that during the flight, the communications operators at the en route centers would "drop everything" and guide the aircraft through space. Position reports of the B-76 would be classified as "Urgent" messages and forwarded to its home station with a minimum of delay. Likewise, messages originated by the home station of the aircraft pertaining to control and operation of the flight would receive the same treatment.

All-out Effort

With all of this coordination of instructions completed, all "hands" were placed on a twenty-four hour a day standby. The hour of departure was postponed several times awaiting favorable weather and wind conditions. When the signal was given to "send it," the all-out effort of the MATS Services was motivated. For all but

The author—Lt. Philip A. Gugliotta, USAF.

the AACS, this was excellent training and testing of personnel and facilities.

On the other hand, AACS, already drastically short of skilled personnel, and their communications circuits working at near maximum capacity, it was a question of deferring most of their other message traffic and diverting their attention to the control and guidance of this flight.

Weather Information

One of the major responsibilities of AACS is the dissemination of weather information on a global scale. This means that all relay stations along the air routes must adhere to precision timing of weather transmissions so that weather stations in all parts of the world can make required predictions, weather maps, etc. These are essential before aircraft can be dispatched for flight between any two points. Therefore, during the preparatory stage and actual flight of the B-76, routine scheduled operations along this route were hampered due to the mesage precedence placed on the special operation.

To complicate matters, partial realization of the number of relay stations that each operational message had to pass through, might subject the reader to "operational fatigue." With the headquarters having primary jurisdiction for this flight being located at Omaha, Nebraska, let us spot check some of these messages to see how they were handled. First of all, the departure message transmitted on take-off was written at Tampa, Florida; then it was sent to a sub-center at Orlando, Florida; thence to a communications center at Warner Robins, Georgia; then to the Air Force communications center in the Pentagon, and then to Omaha, Nebraska.

As the aircraft proceeded west across the United States, additional relay stations were involved, and at the same time, the message added more interested addresses because all stations that had previously been in contact with the aircraft now wanted to know its status. It is sufficient to say that as the aircraft travelled further west toward Japan, the number of relay stations and addresses increased and grew like "topsy."

Delays Not to Be Tolerated

Without painting a black picture blacker, one can readily realize that long range and special mission flights of our first line of defense, the United States Air Force, must not be subjected to the communications delays that are inherent in passing messages through relay stations. To eliminate these delays, these aircraft could more efficiently be guided and controlled from one centralized communications center.

This control point could be the home station of the aircraft, or some other centrally located communications center equipped with adequate radio receiving and transmitting facilities.

Effective radio communications results from a combination of radio equipment, antenna systems, radio wave propagation data, and management.

Adequate and sufficient radio equipment is available, however, the deployment and employment thereof is sometimes improperly planned, from a strategic standpoint.

Much can be learned through the experience of the amateur radio operators of the world, and especially those of the United States. Due to the instinctive competition among these "hams," never a day passes but what some advancement in the state of the art of communications is making history.

In this respect, the radio amateur has shown the world that he can contact any location in the world from his radio "shack," without relays. He has further proven that he can do this with home-made equipment, utilizing a minimum of power, ten watts to one kilowatt, and within the internationally and federally restricted band of radio frequencies authorized for his use.

Rotary Beam Importance

The keynote to this success could very well be credited to the recognized and wide usage of rotary beam antenna systems.

A rotary beam antenna is simply a rotatable multi-element directive array antenna system. Intentionally combining antenna elements into an array results in considerable gain and directivity, both in transmitting and receiving.

Gain in transmitting power is made possible by combining the radiation from a group of antenna elements in such a way as to concentrate it in a desired direction. When used for reception, this directivity feature of the antenna reduces the strength of signals coming from the directions not favored. It also helps to discriminate against a great deal of interference.

Old Stuff to "Hams"

Although amateur radio operators have utilized rotary beam antennas for the past twenty years or more, the Army and the Air Force have only recently procured a limited number of these antennas for short-haul point-to-point radio operations. Several of these antennas are being used by Military Amateur Radio System (MARS) stations.

The primary aim of MARS is to provide emergency radio communications in time of local or national emergencies. In addition, it is anticipated that active "hams" at these military bases will take advantage of the elaborate equipment provided, by conducting experiments which may materially benefit military radio operations. Through this medium, the existing skepticism of centralized communications control of aircraft may be erased from the minds of military planners.

Plane Can Be Followed

Through limited experiments it has been proven that an airplane in flight can be "followed" from one location, using a rotary beam antenna.

For instance, a bomber flight in 1947, from Tokyo to Spokane, Washington, was monitored continuously from a radio station in Washington, D. C. Likewise, numerous flights between the United Kingdom, Germany, Africa, and the Near East, were followed, communications-wise, from this same radio station. During these experiments, rotary beam antenna systems were used for reception, however, only little attempt was made to transmit control and guidance messages to these aircraft.

Although an antenna usually radiates the power applied to it with a high degree of efficiency, if that power does not travel to the desired receiving point, but goes elsewhere instead, the antenna is a failure.

As said before, effective radio communication results from a combination of radio equipment, antenna systems, and radio wave propagation data. The first points have been covered, therefore, the latter now needs a brief explanation.

The propagation of high frequency radio waves over long distances depends on their reflection from the ionosphere, the electrically conducting layers in the earth's upper atmosphere. The characteristics of these layers are continuously changing. Their behavior is affected by seasons of the year, atmospheric disturbances, and certain weather conditions.

For regular and reliable communications, it is therefore necessary to collect and analyze ionospheric data from stations all over the world in order that

prediction of usable frequencies between any two places, at any hour, can be made.

Responsibility for this latter function is invested with the Central Radio Propagation Laboratory of the National Bureau of Standards. It is designed to act as a permanent centralizing agency for propagation predictions and studies, analogous in the field of radio to the reports of the Weather Bureau in the field of meteorology.

Worldwide Data Analysis

The Central Radio Propagation Laboratory (CRPL) receives and analyzes data from approximately sixty stations located throughout the world. Thirteen domestic and eight overseas stations are operated either directly or under contract by the National Bureau of Standards. Other stations in this vast network are operated by universities or other interested agencies. Ionospheric data and predictions are disseminated to the Armed Forces, commercial users, scientists, and laboratories.

One of the many publications promulgated by the Bureau of Standards on this subject is the CRPL series D, Basic Radio Propagation Predictions. It is issued monthly, three months in advance. Contained therein is data for planning purposes, to determine the best sky wave frequencies over any path at any time of the day, for average conditions for the month of prediction.

Now that the essential factors required for effective radio communications have been briefly discussed, the stage is set for a description of how this "power proving" B-76 flight could have been planned so that communications guidance and control could more efficiently and economically have been performed from a central location.

Selection of the appropriate communications center is the first factor to be considered. Whitehall, New York best fits the situation since it more nearly meets the radius distance restrictions set forth in the frequency prediction charts.

Whitehall can be considered to be connected to Omaha, Nebraska by private telephone and teletype lines, and further, that adequate radio equipment and rotary beam antenna systems located thereat.

Propagation Chart

Radio frequency selection is the remaining and most important factor to be considered in this operational planning. Perhaps some day radio transmitters will be equipped with "black boxes" which will provide automatic frequency prediction, thereby eliminating the tedious processes of reading charts and graphs.

Reference would now be made to the Bureau of Standard CRPL Series D radio wave propagation chart for the month of August. This issue would be available in January,[2] therefore, the flight could be planned several months in advance.

Location Known at All Times

Knowing that the departure point for this flight was to be Tampa, Florida, and the final destination, Tokyo, Japan, the Great Circle distance was estimated to be 12,000 miles. The speed of the B-76 at the given altitude was calculated to be 830 miles per hour, therefore, the estimated time enroute was fourteen and one-half hours.

Next, with Whitehall as the focal point, lines at one hour intervals (830 miles) are drawn so as to bisect the Great Circle flight path of the aircraft, to determine the approximate location of the aircraft at all times. Matching these locations with the frequency prediction curves appearing in the CRPL charts, the optimum workable and maximum usable frequencies for each bisected point and areas between are determined.

Without attempting to describe all the technical intricate procedures followed, it is sufficient to say that one frequency between 14.5 and 14.6 megacycles, and one between 29.8 and 30.5 megacycles was the result of the computations.

With a frequency in each of these two spectrums, the radio station at Whitehall would be in continuous contact with the aircraft throughout the entire flight.

Having explained how this adventurous flight was actually conducted, communications-wise, and then outlined how it could have been controlled and guided from one location, several advantages in the latter are very apparent and significant.

Security Considerations

First and foremost, especially in time of war, is the security feature afforded by centralized control. This is said with all due respect to the integrity and patriotism of communications personnel, who are diligently imbued with the necessity for military security. They have been investigated and cleared for access to military secrets. However, *people are human*, and percentage-wise, being proud that they have been "let in" on a secluded plan, some will have the natural instinct to "brag," *unbeknowingly to the wrong people.*

With one communications center instead of fifteen or more involved in an operation of this type, the odds for security leaks are greatly reduced. To provide an added security feature, prearranged one-time simple codes could be devised for use during an individual flight. The use of pronounceable code words in lieu of lengthy clear position reports and instructions would confuse radio intercept and intelligence agencies of foreign countries. A word like "SNAFU" could mean "have reached my 0900 destinations," or "drop the bomb on target 78 instead of target in original plan."

Time Delay

Another distinct communications advantage of central control is the time involved in passing a message from the originator to the addressee. Here again, this is said with all due fairness to the AACS and other communications personnel, for their operational capability, and for the speed and rapidity that they handled the messages relating to control and guidance of the B-76 flight. The time delay that is inherent in passing messages through relay stations cannot be tolerated in controlling aircraft of this type. In achieving the tolerable delays experienced during the B-76 flight, it was necessary to assign a much higher message precedence that position reports and routine instructions are entitled to. By so doing, these messages "outranked" other highly important weather messages normally handled by the relay stations involved. By deferring the weather messages, many routine flights were hampered or had to be postponed due to lack of weather data required in planning their en route clearance.

The advantage afforded by centralized control in respect to interruption of normal communications operations is apparent and needs no further amplification.

Economy in personnel and equipment, afforded by having one communications center to control and guide long range and special flights is likewise apparent and needs no detailed explanation.

Any situation that has as many advantages as the foregoing plan cannot help but have certain disadvantages or limitations.

•

Rotary Beam Limitation

Rotary beams present one serious limitation when required for frequencies below 10 megacycles. That is, the elements of the antenna become exceedingly unwieldly. The length of these elements is inversely proportional to the frequency used. The formula for the driven element is; Length (in feet) = 455 divided by the frequency in megacycles. An antenna cut for ten megacycles would mean that the driven element would be approximately 47 feet in length. It can readily be visualized that these elements, made of aluminum alloy or steel, would be difficult to install and support on a tower. The least amount of wind would naturally cause the elements to flutter in free space, thereby detuning the pattern of

(*Continued on page* 64, *lower col.* 1)

[2]For the purpose of this plan, the most currently available (December) issue was used as a guide.

Telephones Without The "Bell"

"Now there arose . . . a new king . . . which knew not Joseph."
EXODUS 1:8

By Harold V. Bozell
President, General Telephone Corp.

The well-known advertising man, and former Congressman, Bruce Barton, used to declaim this Biblical quotation as a text from which to urge his listeners, who had a story, to tell that story over—and over—and over! Because, as he pointed out, each year there are in this country 1,000,000 or more persons maturing to become the new generation — 1,000,000 or more who were not around to hear what was said last year.

And so it is with the Independent segment of the telephone industry—decreasingly so, however—that each time there is an exposition of the role played by telephone companies outside the Bell System—the so-called Independent telephone companies—in the telephone service of the country a whole new army of people rises to say "I didn't know that before."

Majority Independent

But it is a fact that of the approximately 18,000 telephone exchanges in the U .S., over 11,000 are those of Independent telephone companies, while less than 7,000 are those of the Bell companies. A telephone "exchange," by the way, is an area in which subscribers call each other without a toll charge. They range in size from New York City with its many "central offices" to very small exchanges such as Muleshoe, Texas, with a few hundred telephones or Ossian, Iowa, with only a few dozen.

It is estimated that nearly two-thirds of the area of the U. S. is served by Independent telephone companies. But because the Bell System companies operate in the larger cities—Rochester, N. Y., and Long Beach, Cal., are the largest served by the Independent companies—the Bell System operates over 80% of the telephones in the U. S.. There are about 6,000 separate Independent telephone companies in the U. S. operating nearly 7,000,000 telephones. A new utilities editor of the *Wall Street Journal* a few years ago, when he learned of this segment of the telephone industry, wrote an extensive article characterizing the Independent companies as "The Largest Small Business in the U. S.": About 7,321,000 telephones—total investment of about $1 billion—employees more than 84,000 — gross income about $300,000,000. Yet, while these totals are large, there are over 5,800 Independent companies each serving less than 500 telephones. At the other end of the scale is the largest Independent operating telephone company with a plant investment exceeding $74,900,000, serving more than 382,000 telephones and having annual gross revenues of nearly $17,000,000. There are more than 50 companies having gross revenues of more than $1,000,000 per year.

Courtesy: The Investment Dealers' Digest

One Nationwide Toll System

Despite the existence of so many individual companies, there is one nationwide interconnected toll system so that almost every telephone in the U. S. can call every other telephone in the country and most of the telephones in the world . The Bell System owns the main interstate backbone of the toll network, but many of the Independent companies have extensive toll systems in their various territories.

As in the case of the Bell System, where 21 operating companies have been grouped under the common ownership of American Telephone & Telegraph Co., many of the larger Independents have joined forces in order to lower costs and improve service. The largest Independent group is General Telephone System, serving over 1,200,000 telephones, with annual revenues currently running at $65,000,000 and with about $227,000,000 invested in subsidiary-owned plant. The next largest consists of two telephone holding companies; namely Telephone Bond & Share Co. and Community Telephone Co., controlled by Theodore H. Gary & Co. Other groups are, in order of size, United Utilities, Inc.; Central Telephone Co., a subsidiary of Central Electric & Gas Co.; The Telephone Service Co. of Ohio; Investors Telephone Co. and Western Light & Telephone Co. Some of the larger telephone companies not connected with holding company groups are Rochester Telephone Corp., Rochester, N. Y.; Peninsula Telephone Co., Tampa, Fla.; Mutual Telephone Co., Honolulu, Hawaii; Lincoln Telephone & Telegraph Co., Lincoln, Neb., and Carolina Telephone & Telegraph Co., Inc., Tarboro, N. C.

Bell Patents Once Dominated

The origin and growth of the Independent telephone companies is an excellent example of American individual initiative and imagination. During the 17-year period from 1877-78 to 1894-95, the parent Bell Company and its licensees were the only ones who could develop the telephone commercially, although rugged individualists braved patent infringements and proceeded to make and install equipment of independent design. But with the expiration of the basic patents—and the telephone instrument still uses the principles underlying those patents—the field was open to any and all. There immediately sprang up various manufacturers to make telephone instruments and equipment for use by others than the Bell companies . And hundreds of individuals started telephone systems in smaller towns, and Independent telephone companies started in competition with Bell companies in many of the larger places. By about 1913, there weer approximately 1,000 places in the U. S. where there were two telephone companies.

It is difficult to imagine today, but oldtimers will recall when business men and individuals in their homes had to subscribe to two or more services if they wanted to call and receive calls from everyone with a telephone. Several factors joined forces to bring an end to this duplication. There was a realization on the part of telephone companies and of the public and of government that the best telephone service could be rendered only if any given community was served by a single company, with an interconnected network of toll lines connecting all the companies. There ensued quite a period during which Independent properties were purchased by Bell companies and Bell properties were acquired by Independents. With one or two notable exceptions, the purchase of Bell properties by Independents were about equal to those by the Bell. As a result, local competition between Bell and Independent companies no longer exists, and each community is served by one telephone company.

Hall Memo Agreement

The Bell System, by what is known in the industry as the Hall Memorandum, had agreed not to make further acquisition of Independent properties without first notifying the U. S. Independent Telephone Ass'n and giving opportunity for discussion so that whatever such transfers took place would be felt to be in the public interest. With minor exceptions, the Bell System has not expanded by acquisition since that time. In the Independent field, however, there doubtless will be many more mergers or acquisitions of one Independent by another.

While there may have been some conflicts between Bell and Independents in the past, relations between them today are cordial — and have been for more than 20 years. The two groups—the Bell companies through their parent and the Independents through their Association—have worked out an equitable basis for sharing toll revenues; their committees have worked closely together, especially during the war, and have cooperated in solving problems common to both groups. The Independents acknowledge the outstand-

(*Continued on page* 61, *col.* 2)

TEMPERATURE-LIMITED NOISE DIODE DESIGN

By R. W. Slinkman

Tube Engineering Department, Sylvania Electric Products, Inc.

The measurement of noise figures for electronic equipment has been a subject of considerable investigation and various systems have been devised for the determination of such figures. Of these, the most convenient method evolved to date requires the use of a temperature-limited diode as a noise source. The advantage of this system is the freedom from generator bandwidth calculations or measurements, and the broad, uniform noise spectrum. One may readily determine the noise output of the tube and, consequently, the noise figure of the equipment under test simply by measuring the d-c plate current of the saturated diode and knowing the plate load resistance. In order to achieve accurate results, however, the equipment and the associated diode must be carefully designed to eliminate errors and inaccuracies due to reactance and electron transit time. Although the theory and use of temperature-limited diodes as noise generators for determination of noise figures of amplifiers is well covered in the literature,[1,2,3] very little has been published concerning the design of such tubes. The purpose of this paper is to describe in a general way the design of noise diodes and to indicate a few of the more important characteristics to be considered.

The general theory of shot noise has been treated by many in the field but Campbell[4] in 1909 derived a convenient formula for the noise current of a temperature-limited diode. He showed that

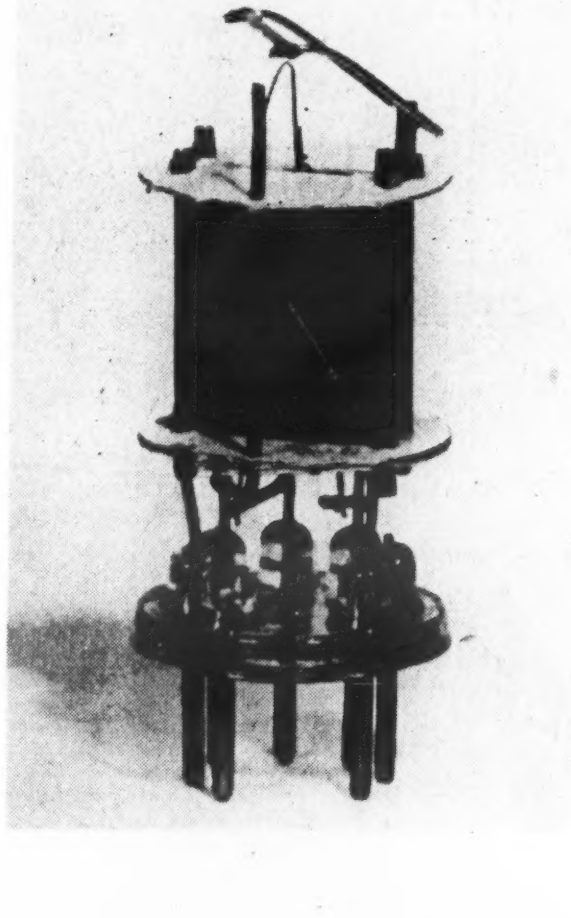
$$I^2 = 2eI_oB = 3.2 \times 10^{-19} I_oB \qquad (1)$$

where I^2 is mean square value of noise current in amperes, B is bandwidth, I_0 is d-c component of anode current, and e is charge on electron

The basis of this calculation is that the passage of one electron from filament to plate gives a type of current pulse whose Fourier analysis indicates that the energy is evenly distributed over the frequency spectrum. This theory assumes that all electrons passing from filament to plate have the same path length which, in the ordinary diode, is not strictly true. However, the percentage of electrons traversing a path substantially greater than the shortest possible is very small and does not seriously affect the validity of the equation. It can be seen from this formula that the noise output for any reasonable current and bandwidth is very low. For example, consider a temperature-limited diode with a d-c anode current of 100 ma, a bandwidth of 10 mc and an output load of 100 ohms. By eq. (1), $I = 0.565$ microampere and the noise voltage is 56.5 milivolts. It should be pointed out that this formula is valid only when the load resistance is small when compared to the internal impedance of the tube. If this condition is not maintained serious discrepancies will result.

There may be some uses of a temperature-saturated diode that demand higher noise outputs. It might be well to consider the factors limiting the developed noise voltage of such a device. The noise voltage, which has been

Fig. 1. Mount of the 5722 tube showing direct connections and large area of plate.



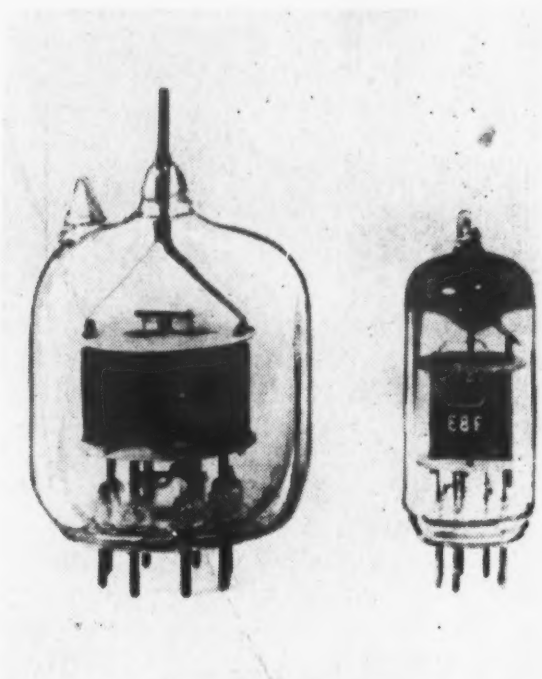


Fig. 2. Left, experimental design for a more powerful generator. Size is indicated by comparison with the 5722 at right.

shown to be a function of the d-c anode current and the load resistance, can be increased by increasing either the load resistance and/or the anode current. However, in either case the power consumed in the load soon reaches a large figure. Increasing the load resistance varies the power dissipation linearly, and, while this might be tolearted, it means that in order to have the same voltage on the anode, the plate supply must be increased accordingly. It should be emphasized that the load resistance must be kept small compared to the internal impedance of the tube if accurate noise figures are desired. Increasing the diode current increases the power dissipation of the load by the rations of the two currents; at this rate it does not take much of a current increase to approach dissipation levels of considerable magnitude.

Nothing has been said so far in the discussion of the effect of increasing the d-c component of plate current on the tube itself, but it would be obvious that increasing the current will necessitate a larger, or at least higher temperature, emitter and increased radiation capabilities of the anode. The way in which these factors affect tube design will be discussed in a later section. From this brief discussion it can be seen that the temperature-limited diode is an efficient producer of noise voltage and that where large noise voltages are required, a considerable amount of power will be consumed within the tube and in the plate load.

In the discussion relating to eq. (1) it was noted that the energy was evenly distributed over the frequency spectrum. However, at high frequencies the noise output is seriously affected by transit time, plate-to-filament capacitance and the inductance of the tube leads. At low frequencies, *i.e.*, at or below a few kilocycles per second, the actual noise output is increased somewhat above the theoretical value by the "flicker" effect, although this is generally not serious in tubes employing plain tungsten filaments.

[1] J. Moffatt, "A Diode Noise Generator," Journal of the Institute of Electrical Engineers, Vol. 93, Part III A, 1946, pp. 1335-1337.

[2] R. F. Burgess, "The Temperature Limited Diode as a Source of Fluctuation Noise," D.S.I.R. Paper RRB/C105.

[3] H. Johnson, "A Coaxial-Line Diode Noise Source for UHF," RCA Review, Vol. VIII, No. 1, pp. 169-185, March, 1947.

[4] N. R. Campbell, Proceedings of the Cambridge Philosophical Society, No. 15, 1909, p. 117.

[5] S. Ballantine, "Schrot-Effect in High Frequency Circuits," Jour. Frank Inst., Vol. 206, Aug. 1928, p. 159.

[6] D. B. Fraser, "Noise Spectrum of Temperature-Limited Oiodes," Wireless Engineer, Vol. 26, pp. 129-131, April 1949.

Transit time will have a very serious effect at extremely high frequencies and will tend to lower the noise output in those regions. Ballantine[5] in 1928 gave an analysis of this effect for parallel plane diodes and Johnson[3] derived a correction term for a noise diode employing cylindrical electrodes. Fraser[6] has recently published a paper concerning noise diodes in which he gives transit time correction factors for both planar and cylindrical constructions.

In order to have some basis for the following discussion it might be well to state the characteristics desired for a particular temperature-limited diode. The type chosen in the Sylvania 5722 which is used as a noise generating device for noise measurement purposes. The general design problems encountered with this tube are typical of those associated with tubes of this type and serve as an illustration of the method of attack. The following electrical and mechanical characteristics were taken as standard.

Filament voltage	6.0 volts approx.
Plate current	30.0 ma
Plate voltage	100 volts
Plate to filament capacitance	3.0 micromicrofarads
Bulb	T-5½
Maximum operating frequency	500 mc
Life	100 hours maximum

With these requirements in mind let us consider first the physical size, basing etc. These factors will be affected by the maximum operating frequency of 500 mc.

The analysis of the equivalent circuit including tube and load shows that a resonant frequency of from 1000 to 1500 mc is desirable. A value of 2.5 micromicrofarads for plate-to-filament capacitance appeared practical on the basis of previous experience so that a lumped inductance, using a resonant frequency of 1500 mc, of approximately 0.0045 microhenries, is all that can be tolerated. Since this inductance will include both plate leads, filament leads and actual filament wire inductance, each of these must be kept to a minimum. The use of multiple connections to the plate, when direct, has been useful in the past in reducing plate lead inductance. This implies the use of at least two plate connections, preferably on opposite sides of the planar plate. The inductance of the filament assembly can be minimized by the use of a filament center tap. Since the mechanical construction of the proposed tube would be enhanced by an inverted "V" filament, the center tap is a convenient spot for the filament tensioning device. The only requirement is that the addition of the extra connection shall not substantially increase the plate-to-filament capacitance.

The filament material selected was pure tungsten, since processing is relatively simple and the low-frequency noise effect is not so pronounced as it is with oxide-coated cathodes or thoriated tungsten. The design of a tungsten filament is a relatively simple matter, provided the desired length and emission properties are established. Reference may be made to Jones and Langmuir[7] who give very complete data which enable the designer to specify the proper wire size with a high order of accuracy.

The design of the plate requires consideration of mechanical details, transit time, rediation, plate-to-filament capacitance and other factors. It should be noted that the design of the plate and filament are interrelated, since the plate is required to radiate a substantial part of the filament power. The width of the plate has been determined largely by the basing and the dimensions of the header as it is desirable to have the plate siderods or lugs welded directly to the header leads. The length of the plate and material used are the two factors left to be varied. If a plate having a carbonized or roughened surface is used, the radiation properties are enhanced to a remarkable degree. The materiel chosen was aluminized steel which has a gray, rough surface for good radiation; it also gives less trouble than other materials from the standpoint of releasing gas during life. Preliminary investigation of filament designs indicated that, for rated plate current and good life, the required filament current was about 1.5 amps. at 5.0 volts. The determination of the amount of filament power which the plate must dissipate is a difficult task, but a rough approximation, based solely on mechanical considerations, indicates that the plate must reradiate at least 60 per cent of the filament power. While the actual plate power required is 3.0 watts, a value of 4.0 watts was chosen in order to allow for some safety factor. The total plate radiation from plate and filament power was at least 8.5 watts. The plate should be operated at the lowest possible temperature in order to keep the amount of gas released during the operation as low as possible. The reason for this is that the life of a tungsten filament is considerably reduced by the presence of gases, particularly oxygen and hydrogen. Bearing in mind the rated maximum allowable dissipation, calculations indicated that a plate one-half inch long would provide an adequate margin of safety.

The plate-to-filament spacing is largely determined by the requirement that the plate current be emission-limited at a plate potential of 100 volts and that the transit angle be less than 90° at 500 mc.

The problem of transit time will be considered first. For simplicity, consider the field in the filament-plate space to be ninear and that there is negligible space charge. Since the tube is to be temperature-limited, these are reasonable approximations. Most of the electrons will take the shortest path to the anode. From the energy relation,

$$mv^2 = 2Ve \tag{4}$$

in which m and e are the mass and charge, respectively, of an electron and v is the velocity. The velocity of an electron at a point where the potential is V will be

$$v = \sqrt{\frac{2Ve}{m}} = 5.93\times10^7 \sqrt{V} \quad \text{cm/sec.} \tag{5}$$

In view of the assumption that the field distribution is linear, the time t required to travel a distance d is

$$t = \frac{2d}{v} = \frac{3.37\times10^{-8}d}{\sqrt{V}} \quad \text{sec.} \tag{6}$$

The assumption of a uniform field at the filament was made for the sake of simplicity. Actually, the field is greatest close to the filament so that, for a given spacing, Eq. (6) is slightly pessimistic for an electron taking the shortest path. A number of factors influenced the final choice of filament-to-plate distance, the figure adopted being 0.0375". Taking the transit angle as the product of angular frequency and transit time, the transit angle for a frequency of 500 mc/sec and a plate potential of 100 volts is thus 58 degrees. From the data given by Fraser, this means that the noise current at 500 mc is about 97.5% of that obtainable at low frequency at constant bandwidth.

Tests of experimental tubes constructed according to a design based on the above considerations were satisfactory when plates, siderods and filament connections were made as simple as possible to provide low plate-to-filament capacitance. The resonant frequency of the structure was above 1000 mc and calculations by E. D. Jarema of Evans Signal Laboratory indicated no appreciable reduction of noise output as the frequency was raised 400 to 500 mc and plate loads up to a maximum of 1000 ohms.

A photograph of the mount is shown in Fig. 1. Attention is called to the direct connections and large area of the plate.

Another design having a plate current of 200 ma at a plate voltage of 150 is in the experimental stage. Since the total power dissipation in this tube exceeds 50 watts, a hard-glass envelope and radiating fins on the anode are used. To prevent the possibility of barium migration from the getter causing difficulty, no getter was used, parts within the tube being made of tatalum. No filament center-tap is used in this construction as it was found that the addition of the extra parts required would otherwise raise the plate-to-filament capacitance to an undesirably high value. Multi-filament leads are used to obtain lower inductance and the plate lead is brought out at the top of the bulb to further lower the capacitance. Preliminary investigation indicates that this tube will cover the same frequency range as type 5722 without correction. The relative size and construction of the two tubes is shown in Fig. 2.

[7] H. A. Jones and I. Langmuir, "The Characteristics of Tungsten Filaments," General Electric Review, Vol. 30, pp. 312-313, 1927.

DANGER OF ANACHRONISMS IN MILITARY THOUGHT

By Major-General C. H. H. Vulliamy, C.B., D.S.O.

Major-General C. H. H. Vulliamy, C.B., D.S.O., was wartime Director of Signals, British War Office. A short time ago he visited the United States and toured signal installations here.

A gibe which has often been made at the expense of Commanders of the Fighting Services, particularly of the Army, is that they train for the next war with the methods of the last and then proceed to fight is opening stages using the old methods even though outmoded by new weapons which may and certainly could be available. Often I have argued in defence of my professional brothers with the non-regular offivers of war time, with professors and with journalists who are particularly prone to doubt the intelligence of the Regular officer. There can, however, be little doubt that there is some basis for the gibe. The cause is difficult to find, but the fact cannot be denied. By a curious paradox it may be due to the retirement, after any major war, of those officers with experience, before that war, higher than command of a unit or brigade. Those that are left have but a nodding acquaintance with the principles which do not change, but are fully conversant with and immersed in the details of the fighting (in the late war) of their units, brigades and the lower formations generally. There is a rush to incorporate this knowledge in manuals or even as a doctrine of war. Principles are overlooked and a mass of detail from the war, just over, becomes the basis of military teaching with the inevitable result that training on the "method" of the last war becomes the order of the day. More directly the cause may be adherence to out-worn ideas in high places, a general reluctance to take the risk of scrapping the old and tried methods in favour of the new.

Tail Wags the Dog

An excellent example of the persistence of the out-of-date in military thought is to be found in this year's subject for the Trench Gascoigne Prize Essay which may gain the Gold Medal of the Royal United Service Institution, that seat of military training, one of whose main objects should be to promote and stimulate the advance of "military thought." The subject chosen is roughly to the effect that in war only a small percentage of the men in the services get to grips with the enemy while the remainder form an administrative tail: what can be done to reduce the latter and increase the proportion of the former? The choice of the subject of this essay is not mere chance. In the War Office, and in all probability in the other Service Ministries, the brains of the General Staff are consulted. The final selection is the result of their studied consideration.

An immediate reaction to such a choice is that the subject is redolent of the past. It brings back memories of the late Lord Milne's summing up after the War Office exercise at Malvern in 1931, held to study the composition and employment of armored formations. The ten C.I.G.S. was most insistent that "the tail must not be allowed to wag the dog,' and that the percentage of men in the fighting arms in comparison with the whole must be kept high. True of the First World War, but not so applicable to the era of military machines which by 1931 had opened. Looking back to the 1914 division of all arms, from memory, the establishment was some 20,000. Of thees about a half were infantry and a quarter artillery. In the remaining quarter were to be found the sappers, signals and the administrative tail which was, therefore, obviously not a high percentage of the whole. In the armored division of thirty years later, it is doubtful if the actual fighting troops were more than a quarter of the division. Tasks which in the past would have been regarded as maintenance were in 1944 performed by men wearing the badges of the fighting arms. Essential maintenance had by this time encroached on the field of combat. The suggested tail which Lord Milne had ridiculed in 1931 had been far surpassed in 1944 in the interests of efficiency learned in the hard school of experience, instead of being introduced at a far earlier date as the result of reasoned study.

The introduction of more complicated weapons requires more men for their maintenance. As the numbers available for the forces are not unlimited, the natural sequence in an increase in the proportion of the "tail" *vis-à-vis* the "teeth." A comparatively small number of men provided with modern means of destruction are far more effective in battle than a large number armed with outmoded weapons. The ultimate outcome of the search for the most effective way of destroying an enemy must necessarily be the adoption of more powerful and hence more complicated weapons. An illustration is the use of bomber aircraft. Here the numbers in actual contact with the enemy, represented by the bomber crews, are a very small percentage of the total human effort involved. They are, however, capable of spreading destruction at great ranges over a wide area. Prior to the Second World War, this power, though possibly not completely ignored, was certainly not accepted at its real value.

During the First World War, air power was in its infancy, in fact, at the beginning of the war it was practically non-existent as a military weapon, but by the end was well established, with an obviously important future. There is no gainsaying that during the inter-war years the development of air power was hampered by a lack of elasticity of mind outside the Air Force, by a general tendency to the known and to shirk the untried weapons with the methods to give them effect. This attitude of mind persisted, if not throughout, well into the Second World War. In the First World War, threatened on our natural heritage, the sea, by a great Power with the resources of a continent behind them, the nation fought a grim struggle for existence on sea, land and in the air. The land effort was on an unprecedented scale, the air effort was new. Failure to grasp the potentialities of air power caused the adoption of a similar form of strategy in the Second World War. The attempt to maintain sea, land and air forces each of the first magnitude and equipped at strength in the modern sense was beyond the capacity of the national resources, and very nearly brought disaster. The sea forces were (and always will be) vital to this country, for on the sea are carried the very means which enable the nation to continue any struggle. A more modern outlook during the inter-war years should have resulted in the allotment of more of the national defence effort to the Air Force at the expense of the Army. Incidentally, there were not lacking some in the Army itself, even in high places, who, looking ahead, advocated this course, but their opinions were not accepted.

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Allotment of Effort

During the Second World War the Army absorbed fifty per cent of the national war effort, the Navy twenty and the Air Force twenty-seven. Of the latter, one quarter, or seven per cent only of the total war effort, went to Bomber Command. Sir John Slessor has said: "I have often wondered if the allotment to the bomber offensive had been increased to ten per cent, whether we would not have been able to return to Europe in 1944 on a march table rather than an operation order." The answer, of course, can never be known, but there is much food for thought in the consideration that such might have been the case had military thought, as a whole, been sufficiently advanced to give the Air Force that to which their undoubted power to strike entitled

(*Continued next page, lower col.* 1)

Courtesy "The Wire"—(British Royal Signals publication)

A Microphone and Headset Tester

By Warrant Officer Clarence W. Cooley

The Armored School
Fort Knox, Ky.

In the communication department of the Armored School at Fort Knox we have found that microphones and headsets issued to students need constant checking for serviceability. This writer, working in the radio repair and maintenance division which has the repsonsibility for such checking, developed a tester, described herein, which was designed to save time and effort.

The microphone tester (Figure 1.) has two circuits—the modulation circuit and the control circuit. The principal parts of the microphone tester are two meters, two ressitors, a 1.5-volt battery, and a microphone jack.

One meter is in the control circuit, and it has a D-C 300-milliampere range. It is connected to the tip of the microphone jack, and is in series with a 5-ohm resistor, a 1.5-volt battery, and the sleeve of the microphone jack.

The other meter is in the modulation circuit and is a Weston Model 507. It is connected to the ring of the microphone jack and is in series with a 1000-ohm resistor, the 1.5-volt battery, and the sleeve of the microphone jack. The value of the resistors was determined by experimentation. The desired value is one that gives almost full-scale deflection on the meters.

To test a microphone you insert the microphone plug into the jack, press the microphone plug into the jack, press the microphone button, and watch the meters. The control meter should read almost full scale, and the modulation meter should vary as you talk or whistle into the microphone. This test will indicate whether the microphone is good or not; it will also indicate whether the tester circuits are defective or not.

For testing headphones a 1-tube audio oscillator can be installed behind the panel (Figures 2 and 3). A switch is included in the phone jack; this switch completes the filament circuit of the oscillator tube when the phones are plugged in.

The audio oscillator uses a 1LN5, a BA-23 filament battery, and a BA-38 battery for plate and screen voltages. Other types of batteries, or an A-C power supply of similar voltages can be used; the above-mentioned batteries were used because they were of convenient size.

To test a set of headphones, put on the set and insert the headphone plug into the jack. If the headphones are not defective, the audio tone from the oscillator will be heard.

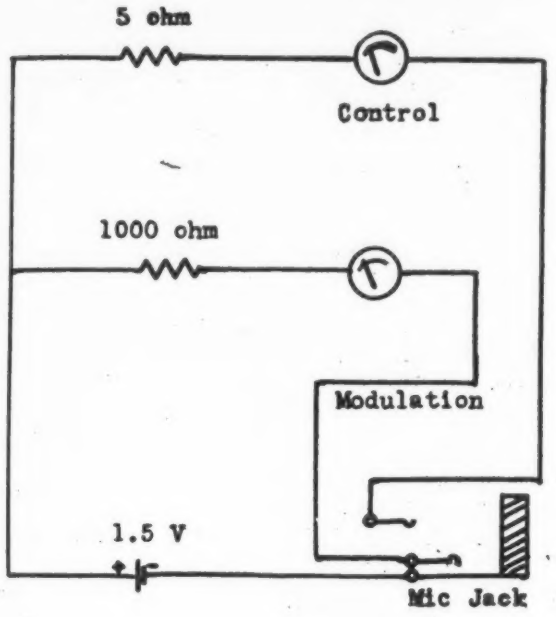

Fig. 1.—Microphone Tester

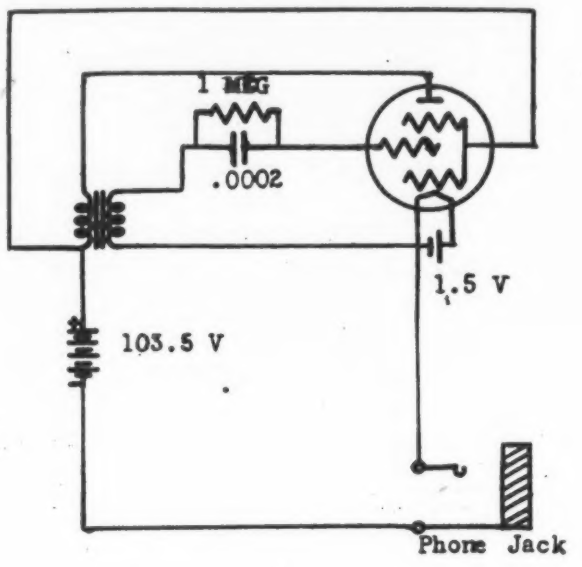

Fig. 2.—Headphone Tester

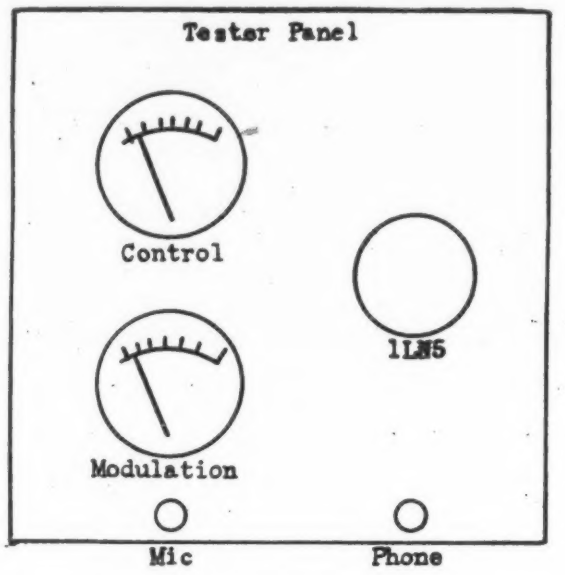

Fig. 3.—Layout of control panel

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them. How much more is this true today in the age of the atom bomb. Lord Trenchard, as reported in the Press, made himself clear on this point in the House of Lords a short while back.

For any future conflict the gloves are off and no holds are barred. There is no reason for suspecting our adversary of undue kindness of heart towards the armed forces or the civil population. The time interval of the last war is unlikely to be available again. The sooner the knock-out blow is delivered, the greater our chance of survival. The armed forces (air, sea and land), our means to this end, are interdependent, and in any future conflict one cannot be successfully employed alone. Surely it behooves us to direct the current of thought to the examination of the methods of organising, arming, supplying and employing these forces with the object of how best to destroy the enemy with the least loss to ourselves of the one irreplaceable asset, our man power. The need for the most modern and efficient methods of destruction is axiomatic. Large numbers are required for their production and maintenance, considerable numbers are necessary to control their employment, while owing to the high mobility and immense power of the weapons which can be produced. the actual fighting crews who come in contact with the enemy are likely to be small by comparison. It is probable that the roles of the air and land forces will be completely changed, the latter becoming a mere subsidiary to the former. It is essential to strike the enemy; a bomber air force is the weapon for this. It is equally essential to ward off the enemy's blows; a fighter air force is the weapon for this. Human masses (even if the nation could make them available) on the ground will not bring victory in the next war. That part of the national effort allotted to defence must be reserved for essentials; out-worn traditions and methods must be dropped to ensure this. Bayonets won Waterloo, but at what a high proportionate cost in human casualties amongst the forces employed. In future, victory will belong to the nation which most ruthlessly employs the best mechanical means of destruction against all its adversary's powers to resist.

The Services must cast off the shackles of tradition and, may it be said, inter-Service jealousies; they must take the risk and cease to waste the national effort on out-worn methods with out-of-date weapons; they must devise new practice for the employment of the latest weapons; otherwise they will try to fight and surely lose the next war with the ways and weapons of the last.

ASSOCIATION AFFAIRS

ARMED FORCES COMMUNICATIONS ASSOCIATION

1624 Eye Street, NW, Washington 6, D. C. Phone: EXecutive 6991

DIRECTORS

Theodore S. Gary (1950)
Dr. Lee De Forest (1950)
Thomas H. A. Lewis (1950)
Thomas A. Riviere (1950)
Frederick R. Lack (1951)
Darryl F. Zanuck (1951)
A. W. Marriner (1951)
C. E. Saltzman (1951)
Leslie F. Muter (1951)
William S. Halligan (1951)
William C. Henry* (1951)
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E. K. Jett (1952)
Jennings B. Dow (1952)
Carroll O. Bickelhaupt (1953)
Thomas J. Hargrave (1953)
R. Adm. Earl E. Stone (1953)
J. R. Cunningham (1953)
Walter Evans (1953)
W. G. Eaton (1953)
Paul Goldsborough (1953)

OFFICERS

Frederick R. Lack*
1st Vice-Pres.: Theodore S. Gary*
2nd Vice-Pres.: Thomas J. Hargrave*
3rd Vice-Pres.: R. Adm. Earl E. Stone
4th Vice-Pres.: J. R. Cunningham
5th Vice-Pres.: Carroll O. Bickelhaupt
Past President: David Sarnoff
Counsel: Frank W. Wozencraft*
Executive Secretary: George P. Dixon*

**Executive Committee Member*

Theodore S. Gary Elected AFCA President

Will Be Last President to Take Office in July;

Fiscal Year Hereafter to End Just Before National Meeting

Other Constitution Changes Approved By the Board of Directors

New Cover for Signals; Title Change;

Elected by the Board of Directors at the May 12th New York business phase of the 1950 national meeting, the new president of the AFCA is Theodore S. Gary, vice president of Theodore Gary & Co.

If the association general membership approves the recommendations of the Board of Directors and the Council, made at the convention, Mr. Gary will be the last president to take office at a later date than the national meeting. In the future, it was planned, there will be no "lame duck" period and all officers will take office immediately after the national convention instead of the July 1st date which has been marking the beginning of tenure of office.

Vice presidents elected at the national meeting were W. W. Watts, Rear Admiral Earl E. Stone, J. R. Cunningham, C. O. Bickelhaupt, and David R. Hull. George P. Dixon was reelected for another term as executive secretary, and Frank W. Wozencraft as counsel. Further details will be found in the feature story in this issue on the convention.

The association publication SIGNALS, came under considerably more discussion at the 1950 meeting than at any previous convention. Recommendations were made which, if approved, will result in a change of cover for the magazine and a slight change in the title in which the final "S" would be dropped to make the title "SIGNAL."

Revised Constitution Voting

A mimeographed copy of the AFCA constitution, indicating changes recommended by the Board of Directors at the 1950 annual meeting, was mailed to each active member of the Association shortly after the convention. Accompanying each copy was a ballot on which the member was to vote his approval or disapproval of the proposed changes, and then return by mail to national headquarters.

In the meantime President Frederick R. Lack appointed the following as tellers: Association Counsel Frank W. Wozencraft; Francis H. Engel, RCA Victor Division and president of the Washington Chapter; Thomas De Nyse, Western Electric Company radio division representative.

The revised version of the constitution, if confirmed by the general membership, will be published in the next issue of SIGNALS.

Adm. Hooper, Radio Pioneer, Made Honorary Life Member

Rear Admiral Stanford C. Hooper, considered the "father of radio use in the armed services," was presented with a certificate, on June 8th, naming him an Honorary Life Member of the AFCA. The presentation was made by National Executive Secretary George P. Dixon at a luncheon given in Admiral Hooper's honor by Colonel Percy Black, Washington representative of the Automatic Electric Company.

Washington Chapter President Francis H. Engel attended the informal ceremony, and armed services communications leaders present were Brigadier General Wallace C. Smith, commanding general of the AACS; Rear Admiral John R. Redman, director of Naval Communications; Captain Donald E. McKay, chief of communications of the Coast Guard; and Brigadier General Wesley T. Guest, chief of communications for the Army Signal Corps.

Admiral Hooper was foremost among the early pioneers who realized the enormous potential of "wireless" communications for military use. He was the first U. S. Fleet radio officer. And ten years after his graduation from the U. S. Naval Academy in 1905 he be-

came the head of the Radio Division, U. S. Navy, serving in that capacity for three tours of duty.

Loaned to the Federal Radio Commission, predecessor to the FCC, Admiral Hooper served as chief engineer for that body from 1927 to 1928. Returning to the Navy in 1928 he became the first Director of Naval Communications, a position he held until 1934.

Recognition of Admiral Hooper's outstanding career in his contributions to the advancement of radio has been demonstrated in awards such as the Gold Medal of the Institute of Radio Engineers, awarded in 1934; the Marconi Medal of Merit, 1939; and the Elliot Cresson Medal, Franklin Institute, 1945. He has also received many military decorations awarded by the United States and other countries.

Admiral Hooper served as United States delegate to International Radio Conferences at The Hague, Bucharest, Lisbon, Cairo, and Chile.

Retired from active duty since 1943, Admiral Hooper has served as electronics and communications consultant to the Radio Corporation of America, the Hazeltine Corporation, and others.

Articles From Group Members To Be Published In Signals

During the first part of May the Executive Secretary, George P. Dixon, sent out to all group members a letter inviting, for publication in SIGNALS, articles from them describing their companies, their operations, and their products in the case of manufacturing firms.

The response to these invitations has been highly gratifying to AFCA headquarters and to SIGNAL's editors. Several articles have already been received, and it is indicated that many more will be sent.

Movies of Convention

Thorough motion picture coverage of the AFCA 1950 annual meeting was provided from start to finish of the convention by the Signal Corps Photographic Center, Long Island, New York.

From registration at the Commodore Hotel the first day of the meeting, May 12th, through business meetings, banquet, and the second day activities at Fort Monmouth—the Signal Corps cameramen shot it all.

After the film has been edited a copy will be made available for showing at all AFCA chapters.

The national executive secretary, George P. Dixon, attended a showing of the film, before editing, at the Pentagon. Secretary Dixon reports the film as being excellent, and that it should be of great interest to all members.

CHAPTER OF THE YEAR CONTEST WINNER

Augusta-Camp Gordon

Consistently maintaining its lead since December 31st, 1949, the *Augusta-Camp Gordon Chapter* crossed the finish line on April 30th with 32.9 points to become AFCA's 1950 Chapter of the Year.

Sacramento, which had been running neck and neck with Chicago and Fort Monmouth, at the last minute spurted ahead with a large number of new memberships to win second place with 25.5 points.

***Chicago, Fort Monmouth* and *Pittsburgh* edged out the competition from *Cleveland* and *Southern California* to win honorable mention with some 16 points each.**

According to the rules of the contest, the number of paid-up members as of May 1, 1949 in each chapter was used as a basis for determining the percentage of new or renewed memberships in the chapter during the year of the contest. The percentage of new members was then multiplied by 5 to establish the points for this phase of chapter activity, and the percentage of renewed members was multiplied by 10 in order to place emphasis on the importance of maintaining continuity of membership in the association. In addition, one point was awarded for each chapter meeting held during the year.

***Augusta-Camp Gordon* recorded 363% in new members, 57% in renewals, and held 9 meetings. *Sacramento* showed 151% in new members, 109% renewals, and held 7 meetings. (Not only did Sacramento renew all its members on the books on May 1, 1949, but also picked up a number of those who had previously dropped out.) *Fort Monmouth* brought in 114% in new members, 77% renewals, and held 3 meetings. *Pittsburgh* showed 25% new members, 86% renewals, and held 7 meetings. *Chicago* had 34% new members, 61% renewals, and held 9 meetings.**

The rules of the contest were discussed at the chapter presidents' conference during the annual convention and it was unanimously decided they were equitable and therefore should continue in force for the 1950-1951 contest.

Past-President Hugh A. Fleming (left) congratulates President Henry J. Hort of Augusta Camp Gordon on chapter's winning annual contest.

President Henry J. Hort of Augusta-Camp Gordon reads notification of chapter's winning "chapter of the year" award to (L-R) Maj. Norman J. Kinley; D. K. Jones, Secy-Treas.; Lt. Col. Thomas K. Trigg, V. Pres. and Hugh Fleming, Past Pres.

CCAFA

Announcement of the merging of several of its member associations marked the Coordinating Committee for Armed Forces Associations' final luncheon-meeting for the 1950 summer season at the Army-Navy Club, Washington, D. C. on May 16th.

There having been no special business requiring concerted action on the part of the committee, reports were delivered at the meeting by members on matters of individual operations. During the course of these reports it was revealed that the following associations and their publications will soon cease to exist as separate organizations: The United States Coast Artillery Association; The United States Field Artillery Association; The U. S. Armored Cavalry Association; and the U. S. Infantry

Association. All of these will be merged into the Association of the U. S. Army. The new publication, replacing the individual journals of the separate associations, will probably begin publication with an August 1950 issue. At the time of the CCAFA meeting it was as yet unnamed.

(*As it actually developed in the period following the CCAFA meeting, the merger was not as extensive as it had been considered that it would be. Only the Infantry and the Field Artillery Associations merged. The new publication name was recently announced as the United States Army Combat Forces Journal. At the CCAFA meeting it had also been announced that the then contemplated merger would affect various personnel, and that some members would therefore be lost to the CCAFA. Presumably this would no longer hold true in entirety.*)

Following the matter of discussion of the merging of the several associations, Colonel George P. Dixon, Executive Secretary of our own association, presented a summary of the recent excellent AFCA national meeting at New York City and Fort Monmouth. Colonel Dixon stressed, in his report on the business phase of the convention, the emphasis given to the chapter presidents' meeting, pointing out that the "chapters are the life-blood of any association." He further extolled the magnificent preparations and subsequent performance of Fort Monmouth for the second day of the convention.

Addresses Unknown

Copies of SIGNALS mailed to the below listed members have been returned to us because the latest addresses we have for these names are incorrect. If you know the present address of any of these members please jot it down on a post card and send it to us.

W. H. Anderson
Pvt. Samuel R. Ballard
Pvt. Lyndon B. Bledsoe
Pvt. Hector J. Burelle
Lt. Col. Carmon L. Clay
Mr. Joseph Corig
Maj. Charles C. Dewy
1st Lt. Claude A. Ernst
Rct. Jerry O. Elliot
Col. Gerrit H. Fletcher
Capt. Arthur M. Fredenburg
J. Leonard Hogg
James B. Kerr
Lt. Col. Eldon A. Koerner
Rct Jan Lemanski
M/Sgt. Peter M. Martin
Alvin M. Miller
Sgt. Charles A. Montague, Jr.
James T. Nash
Arthur W. Owens
1st Lt. John M. Panek
Major J. B. Prestridge
Cpl. Albert Riggs
Maj. Aldred W. Rogers
Pvt. Henry J. Sasinowski
Pvt. Manuel D. Sianez
Pvt. Harold G. Spelbring
Cpt. Isaac Stephens
Rct. William Stephens
George Van Horn
Maj. Bernard K. Waro

AFCA GROUP MEMBERS

Communications—Electronics—Photography

Listed below are the names of the American firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation in our special fields.

Acme Telecronix
American Institute of Electrical Engineers
American Phenolic Corporation
American Radio Institute, Inc.
American Radio Relay League
American Steel & Wire Company
American Telephone & Telegraph Co.
Anaconda Wire & Cable Company
Arnold Engineering Company
Astatic Corporation
Automatic Electric Company
Automatic Electric Sales Corp.

Baltimore News Post
Baltimore Radio Show, Inc.
Barry Corporation, The
Bell Telephone Company of Pa.
Bendix Radio
Bliley Electric Company
Breeze Corporation, Inc.
Burnell & Company

California Water & Telephone Co.
Capitol Radio Engineering Inst., Inc.
Carolina Telephone & Telegraph Co.
Central Radio and Television Schools
Chesapeake & Potomac Tel. Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electric School, Inc.

Diamond State Telephone Co.

Eastman Kodak Company
Eby, Inc., Hugh H.
Electronic Associates, Inc.
Electronic Designs, Inc.
Espey Manufacturing Co., Inc.

Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.

General Aniline & Film Corp.
General Cable Corporation
General Electric Company
General Instrument Corp.
General Telephone Corp.
Gilfillan Bros., Inc.
Gray Manufacturing Co.

Hallicrafters Company
Haloid Company
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motors Corp.
Hoffman Radio Corp.

Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Resistance Co.
International Tel. & Tel. Corp.

Jacobsen Manufacturing Co.

Kellogg Switchboard & Supply Co.
Kleinschmidt Laboratories, Inc.

Lavoie Laboratories
Leich Sales Corporation
Lenkurt Electric Company, Inc.
Lewyt Corporation

Machlett Laboratories, Inc.
Magnavox Company
P. R. Mallory & Co., Inc.
Merit Coil and Transformer Corp.
Michigan Bell Telephone Company
Motorola, Inc.
Mountain State Tel. & Tel. Co.

National Carbon Company, Inc.
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
North American Philips Co., Inc.
Northwestern Bell Telephone Co.

Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Operadio Manufacturing Company

Pacific Telephone & Telegraph Co.
Philco Corporation
Photographic Society of America

Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Ray-O-Vac Company
Reeves Instrument Corp.
Remington Rand, Inc.
Rola Company, Inc.

Sherron Electronics Co.
Smuckler & Company, Inc., A. F.
Society of Motion Picture Engineers
Sonotone Corporation
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sperry Gyroscope Company
Stackpole Carbon Company
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.

Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Times Facsimile Corporation
Tung-Sol Lamp Works, Inc.

United Radio Television Institute
United States Rubber Company

Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company

CHAPTER NEWS

National Director of Chapters: Theodore S. Gary, 1033 W. Van Buren St., Chicago, Ill.

AREA REPRESENTATIVES FOR CHAPTERS

Area A: William H. Harrington, 195 Broadway, New York 7, N. Y. *New England States, New York, New Jersey*

Area B: J. H. LaBrum, Packard Building, Philadelphia, Pa. *Delaware, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia*

Area C: W. H. Mansfield, So. Bell T&T Co., Atlanta, Ga. *Southeastern States along Atlantic and Gulf coasts—from North Carolina to Louisiana including Tennessee*

Area D: Lury B. Redmond, 6106 Victor St., Dallas, Tex. *New Mexico, Texas, Oklahoma, Arkansas*

Area E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. *Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado*

Area F: H. L. Hoffman, 3761 S. Hill St., Los Angeles, Calif. *Arizona, Utah, Nevada, California, Idaho, Oregon, Montana and Washington*

CHAPTERS: PRESIDENTS AND SECRETARIES

ATLANTA: President—Ralph S. Grist, Southern Bell Tel & Tel Co., Hurt Bldg., Atlanta, Ga. Secretary—Capt. R. L. Oertle, SigSec, Hqs 3rd Army, Ft. McPherson, Ga.

AUGUSTA-CAMP GORDON: President—Henry J. Hort, SCTC, Camp Gordon, Ga. Secretary — P. K. Jones, Southern Bell Tel & Tel Co., Augusta, Ga.

BALTIMORE: President — Wilbur L. Webb, 5710 Kenmore Rd., Baltimore, Md. Secretary — George C. Ruehl, Jr., 1 Tanglewood Rd., Baltimore, Md.

BOSTON: President—T. F. Halloran, General Communication Co., 530 Commonwealth Ave., Boston, Mass. Secretary — James E. Foster, Asst. PMS&T, M.I.T., Cambridge, Mass.

CHICAGO: President — Oliver Read, Radio News, 185 N. Wabash Ave., Chicago, Ill. Secretary — Raymond K. Fried, 111 W. Monroe St., Chicago, Ill.

CLEVELAND: President — Lee J. Shaffer, 1320 Superior Ave., N. W., Rm. 205, Cleveland, Ohio. Secretary—T. F. Peterson, American Steel & Wire Co., 1434 Union Commerce Bldg., Cleveland, Ohio.

DALLAS: President (acting)—Warren S. Hatfield, Southwestern Bell Tel Co., Dallas, Tex. Secretary (acting)—Lury B. Redmond, 6106 Victor St., Dallas, Tex.

DAYTON-WRIGHT: President — Edward H. Bobzean, Ohio Bell Tel Co., 215 W. 2nd St., Dayton, Ohio. Secretary — Philip H. Johnson, 2028 Colonial Village Lane, Dayton, Ohio.

DECATUR: President—Robert C. McMurtrey, 2400 Kirby Court, Decatur, Ill. Secretary — Edward C. Whitcomb, 2912 E. Wood St., Decatur, Ill.

EUROPEAN: President—I. P. Doctor, SigO, Frankfurt Mil. Post, APO 757, New York. Secretary—C. E. Laurendine, Comm. Gp., Bi-Partite Control Office, APO 757, New York.

FAR EAST: President — George I. Back, Sig Sec, GHQ, FEC, APO 500, San Francisco, Calif. Secretary — Luster R. Kleinknight, Sig Sec, GHQ, FEC, APO 500, San Francisco, Calif.

FORT MONMOUTH: President—J. D. O'Connell, 15 Allen Ave., Fort Monmouth, N. J. Secretary—Huston E. Maxwell, SigCorps Board, Fort Monmouth, N. J.

GREATER DETROIT: President — Robert J. McElroy, Michigan Bell Tel Co., 333 State St., Detroit, Mich.

KENTUCKY: President — Robert H. McAteer, 1062 E. Cooper Drive, Lexington, Ky. Secretary — Clyde T. Burke, Lexington Signal Depot, Lexington, Ky.

LOUISIANA: President—Peter M. Miller, Jr., 1936 Robert St., New Orleans, La. Secretary—A. Bruce Hay, Southern Bell Tel & Tel Co., 520 Baronne St., New Orleans, La.

NEW YORK: President — Thompson H. Mitchell, RCA Communications, Inc., 66 Broad St., New York, N. Y. Secretary — David Talley, International Tel & Tel Corp., 67 Broad St., New York, N. Y.

PHILADELPHIA: President — W. W. Watts, RCA Victor Div., Camden, N. J. Secretary—Joseph Bergman, Sig Corps Stock Control Agency, 2800 So. 20th St., Philadelphia, Pa.

PITTSBURGH: President — E. J. Staubitz, 204 Tennyson Ave., Pittsburgh, Pa. Secretary—Sylvester C. Stoehr, Jr., 201 E. Main St., Carnegie, Pa.

RICHMOND: President—E. T. Maben, Chesapeake & Potomac Tel Co., 703 E. Grace St., Richmond, Va. Secretary—Lelia V. Fussell, Chesapeake & Potomac Tel Co., 703 E. Grace St., Richmond, Va.

SACRAMENTO: President — M. G. Mauer, 2320 Ralston Rd., Sacramento, Calif. Secretary — C. A. House, Sacramento Signal Depot, Sacramento, Calif.

ST. LOUIS: President — Charles P. Bobe, 5252 Nottingham Ave., St. Louis, Mo.

SAN FRANCISCO: President — Harry E. Austin, RCA Communications, Inc., 28 Geary St., San Francisco, Calif. Secretary — William G. Damerow, 1625 Pacheco St., San Francisco, Calif.

SEATTLE: President — Clarence D. Lawrence, 5336 Hazel St., Seattle, Wash. Secretary — Clarence C. Bodine, 6812 Phinney Ave., Seattle, Wash.

SOUTH CAROLINA: President—Fred M. Fister, Southern Bell Tel & Tel Co., Owen Bldg., Columbia, S. C. Secretary — John A. Norman, 238 Waccamaw Ave., Columbia, S. C.

SOUTHERN CALIFORNIA: President—Arthur C. Hohmann, City Hall, Los Angeles, Calif. Secretary—Richard F. Walz, 5808 Marilyn Ave., Culver City, Calif.

WASHINGTON: President — Francis H. Engel, RCA Victor Div., 1625 K St., N. W., Washington, D. C. Secretary — Edward C. Cover, Chesapeake & Potomac Tel Co., 725 13th St., N. W., Washington, D. C.

STUDENT CHAPTERS

CORNELL UNIVERSITY, Ithaca, N. Y.

NEW YORK UNIVERSITY: President—William A. Bocchino, 2007 Sedgwick Ave., University Heights, N. Y. Secretary—Robert E. Buckley, 2007 Sedgwick Ave., University Heights, N. Y.

OKLAHOMA A & M COLLEGE, Stillwater, Okla.

STATE COLLEGE OF WASHINGTON, Pullman, Wash.

TEXAS TECHNOLOGICAL COLLEGE: President—Thomas C. Penn, West Hall, Texas Tech, Lubbock, Tex. Secretary — M. G. Harris, Texas Tech, Lubbock, Tex.

UNIVERSITY OF ALABAMA: President—Butler P. Hine, Jr., PO Box 5305, University, Ala. Secretary — Emory W. Morris, PO Box 3009, University, Ala.

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

UTAH STATE AGRICULTURAL COLLEGE: President—Marvin H. Stoneberg, 290 N. 2nd E., Logan, Utah. Secretary—George L. Beutler, 133 E. Center, Smithfield, Utah.

NATIONAL HEADQUARTERS CHAPTERS SECRETARY: JULIA B. GODFREY

CHAPTER NEWS

Atlanta

The Atlanta Chapter has dispatched an ambassador of good will to its fellow chapter in the Far East in the person of Captain Dewey Allread, Jr., its secretary-treasurer, who was recently transferred to Japan. Captain Allread was one of the outstanding chapter secretaries in the association and both Bill Mansfield, Atlanta chapter president, and George Dixon, AFCA Executive Secretary, wrote General George I. Back, president of the Far East chapter, that the Far East chapter was gaining an excellent AFCA administrator who was anxious to continue to serve the association.

Captain Robert L. Oertle, Pictorial Division, Signal Section, Hqs. Third Army, has been elected to succeed Captain Allread as Atlanta Chapter secretary-treasurer.

Augusta-Camp Gordon

Chapter president Col. Henry J. Hort and past president Hugh A. Fleming represented Augusta-Camp Gordon at the AFCA annual convention and brought back a souvenir for the rest of the chapter in the form of the AFCA 1950 Chapter of the Year award. A full report on the convention was presented to chapter members at a dinner meeting on May 17th at the Officers' Club, Camp Gordon.

After President Hort announced that the chapter had won the "Chapter of the Year" honors, a framed copy of the award was turned over to Vice-President Thomas K. Trigg for display with other trophies. Major Norman J. Kinley and Lieutenant Thomas W. Doeppner were cited for outstanding service to the chapter during the contest.

After considerable discussion in regard to a change in meeting dates, a motion was made and passed to change the date to the first Monday night in each month subject to the approval of the members not present at the meeting to whom a letter would be mailed.

The featured speaker of the evening was Colonel W. D. Harden who, in commemoration of Armed Forces Day, gave a most interesting talk on unification.

The program closed with the motion picture "Stillwell's Road."

Baltimore

Dr. Ferdinand Hamburger, chairman of the electrical engineering department of Johns Hopkins University and professor of electrical engineering, spoke on "Information Systems Research" at the May 24th dinner-meeting of the Baltimore Chapter held in Levering Hall of Johns Hopkins University.

The university has a contract with the U. S. Navy to furnish them with pertinent radar equipment studies and information, and a group of electrical engineers and psychologists have been working for the past four and a half years, having turned in over eighty finished studies and fifteen partial reports. Dr. Hamburger's talk was illustrated with lantern slides and was most interesting even to laymen. The depicted advancement in target location, azimuth, height and distance all at one time was amazing to anyone who worked with P.P.I.'s during the recent war. After his talk, Dr. Hamburger took the guests through his special laboratory where some of the new equipment was set up and working.

Following the dinner, Commodore Jack Jett, president of the Baltimore chapter, introduced Colonel George P. Dixon, National Executive Secretary, who spoke briefly on the recent annual AFCA convention in New York and at Fort Monmouth.

The nominating committee then brought in their slate of officers for the next chapter year as follows: President—Wilbur L. Webb, director of engineering & research, Bendix Radio Division; 1st vice-president—Col. M. D. Harris, deputy commanding officer, Baltimore Signal Depot; 2nd vice-president—Capt. Richard E. Elliott, commanding officer, U. S. Naval Communication Station, Annapolis; 3rd vice-president — Col. Henry W. Williams, plant engineer, Chesapeake & Potomac Telephone Co.; Secretary — George C. Ruehl, Veterans Employment representative in Maryland for Department of Labor; Treasurer — Col. Roy T. Bucy, signal section, Second Army, Fort George Meade; member executive committee at large—Commodore E. K. Jett, vice-president, Baltimore Sun Papers and in charge of Station WMAR. The slate was unanimously elected.

Approximately fifty members were present. The next meeting will probably feature a trip to one of the large nearby plants.

Boston

The newly activated Boston Chapter met at the Boston Naval Shipyard in Charlestown on the evening of April 27th. Rear Admiral T. F. Halloran, USN (ret.), General Communication Company, who had been acting as chairman of the working committee toward the rehabilitation of the chapter, presided at the meeting. In his opening remarks he explained to the members and others who had come to the meeting because of interest in the association what the plans were for the local chapter and why Boston should be represented in the association as one of the outstanding chapters. Admiral Halloran gave much credit to his working committee for getting the crowd out to this first meet, and then called on Colonel George P. Dixon, AFCA Executive Secretary, to tell something about the national setup of AFCA and its objectives.

Colonel Dixon covered this subject at some length, mentioning the old American Signal Association which had been so well run in Boston by Major Thomas Dooling, now a director of AFCA's San Francisco chapter, and stating that he was sure that with such an interested group to start things off the Boston chapter would soon be in the top ranks of AFCA chapters.

The next item of business was the election of officers and the following names were submitted by Raymond B. Meader of the New England Telephone & Telegraph Co., chairman of the nominating committee, and upon motion duly made and passed were elected: President—T. F. Halloran; vice-presidents—Myron D. Chase, New England Tel & Tel Co., and Paul Hannah, Raytheon Company; secretary — Major James E. Foster, Asst. PMS&T, Massachusetts Institute of Technology: treasurer—Gardiner Greene, Workshop Associates; National Council member —Lt. Col. F. H. King, Signal Officer, 67th Fighter Wing, Air National Guard; members at large for executive committee—Raymond B. Meader and

The Winner: Chapter of the Year Contest
AUGUSTA — CAMP GORDON

(*See Association Affairs, page 37, for details*)

Chicago chapter dines in smorgasbord style at meeting near Motorola plant.

Capt. A. R. Taylor, supervising inspector of Naval material.

Following the business meeting the group adjourned to the officers' mess at the naval shipyard where an excellent dinner was served and an opportunity was afforded everyone to become better acquainted.

Chicago

Motorola, Inc., was host to Chicago chapter members on March 28th. A smorgasbord dinner and meeting in a neighboring hall preceded a tour of the Chicago Motorola plant.

Dwight Brown, vice president of the Chicago Chapter, opened the meeting in the absence of chapter president Oliver Read, and recalled that it was almost a year since the plant-type meeting was adopted by the chapter with outstandingly successful results.

Robert W. Galvin, executive vice-president of Motorola, before introducing the speakers of the evening, gave a brief history of Motorola, Inc., which has been in business for 22 years, largely financing itself out of its earnings. In 1930, Motorola manufactured automobile radios; in 1937 they began manufacture of radios for the home; they assigned $100.000 independently to military research and by 1940 were engaged in the entire communication business—military and civilian. In 1947 they undertook the manufacture of television, in which they are today the fourth largest manufacturer.

Mr. Myron E. Whitney, assistant manager of Motorola, then presented a paper on "Motorola's Program for Decentralization of Facilities for Military Preparedness," written by D. E. Noble, Motorola's director of research who was unable to be present at the meeting.

Dispersal is of the utmost importance to the national security and in line with this thinking Motorola now has a plant working on military equipment in Phoenix, Arizona. Mr. Whitney quoted that "communication is the enemy of chaos" and for the purpose of protecting the manufacture of communication equipment the advantages of the Southwest as a dispersal area are evident. The climate, ease of field testing, housing, labor, transportation accessibility are all conducive to making the Southwest an important dispersal area for the manufacture of the "most important aspect of defense"—communications.

Mr. Henry Magnuski, chief engineer of the communications and electronics division of Motorola, discussed "Microwave Relay Communications" the point-to-point communications technique developed for radar during World War II. Motorola conducted research in this field during the war and several installations are now in commercial operation.

Mr. Magnuski pointed up some of the advantages of microwave relay over the familiar "land lines" in use, for telephone, telegraph, and television communications between two or more terminal stations, using several "repeaters" spaced 20 or 30 miles apart. The reliability of this type of communication is independent of weather and tube failures are offset by "automatic switchover" to stand-by equipment. Also, the costs of microwave relay installations are lower for some commercial and industrial uses. The maintenance of microwave relay requires no large crews and the future of this type of communication on the wide band frequencies available for microwave relay appears very bright.

Mr. Galvin added that those present, in viewing the microwave equipment, were seeing a new industry within the communications industry, and that within twenty years people everywhere should be familiar with widespread applications in industry and everyday life.

John Doremus, chief engineer, control engineering department of Motorola, was the last speaker of the evening and talked on "Recent Developments in Mobile Communications and Selective Signalling." Seventy thousand licensed systems with over 200.000 mobile units are now in use. Channel-sharing and new areas of the spectrum have been opened for their communication. Freedom-from-interference-effectiveness is a related problem as well as the closeness of transmitters, requiring the stability of each.

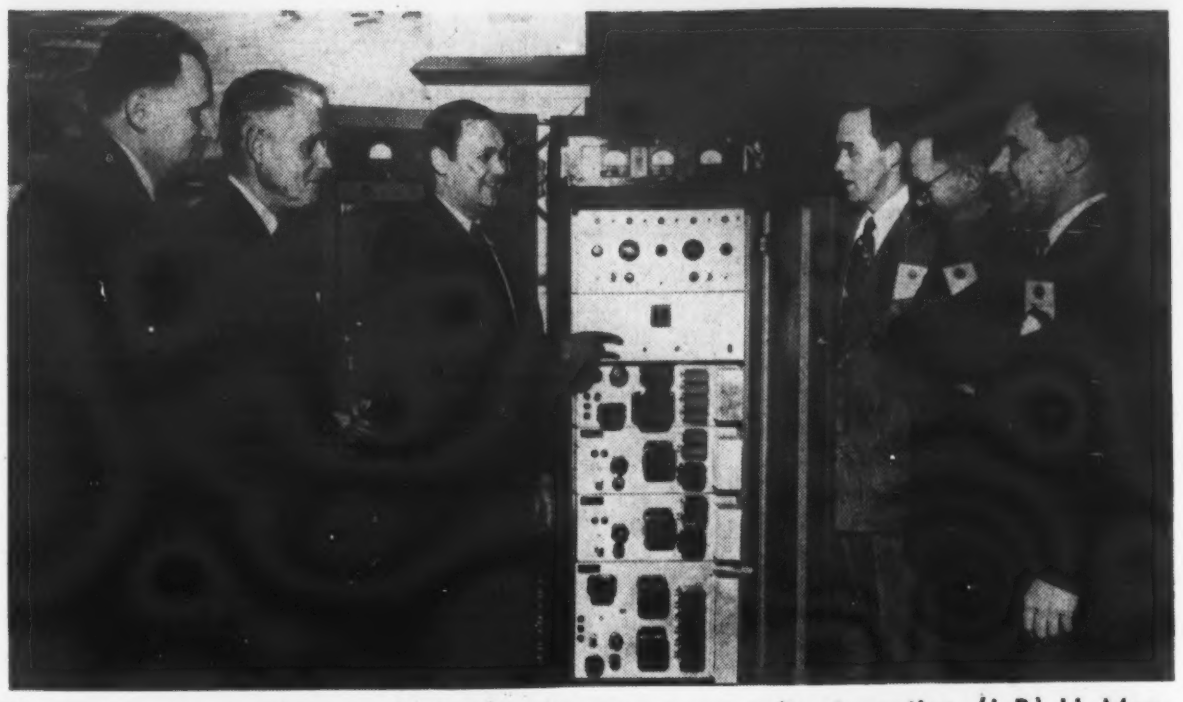
The meeting closed with demonstration of Motorola equipment, inspection by the chapter members and guests, and a plant tour of Motorola's television production lines.

* * *

On April 24th the chapter met with the Society of Motion Picture and Television Engineers and the Institute of Radio Engineers for a joint technical session at the Drake Hotel.

Two illustrated talks were co-featured. Frank H. McIntosh, consulting engineer from Washington, D. C., spoke on "Properties and Characteristics of Color TV Systems proposed to the FCC," and Col. John R. Howland, of the Zenith Radio Corporation and a director of the AFCA chapter in Chicago, discussed Zenith's "Phonevision." A film demonstration of the contemplated "Phonevision" operation was shown and Colonel Howland presented the economic arguments for the plan.

Prior to the joint session, AFCA chapter members met for dinner at the Reserve Officers' Club in the Knickerbocker Hotel.



Chicago chapter members see Motorola microwave power units at meeting. (L-R) H. Magnuski, Motorola chief electronics engineer; Carrington H. Stone, co-chairman of the program committee; John Doremus, Motorola chief of control engineering; Robert W. Galvin, Executive VP of Motorola; Dwight Brown, chapter VP; and Myron E. Whitney, Motorola assistant manager.

Cleveland

Cleveland chapter members and guests met in the Ohio Bell Telephone Building on April 13th for a discussion and demonstration of nationwide television networks.

Robert Clark of the Ohio Bell public relations staff took over the preliminary portion of the meeting and presented a very interesting and enlightening demonstration on the principles of radio relay and microwave transmission. A. M. Rose, division transmission engineer of the Long Lines Department, AT&T, then discussed some of the problems associated with furnishing television service on network facilities.

The Bell System film, "Stepping Along with Television," followed the discussion, and the group was then conducted through the microwave terminal facilities located on the top floor of the Telephone Building. The equipment associated with studio to transmitter microwave facilities was also inspected. This equipment is used to relay the television signals to the television transmitter locations from network facilities or downtown studios. The final item in the tour was the control room and terminal equipment associated with coaxial cables terminating in Cleveland.

Refreshments and a social hour concluded the evening's program.

In lieu of its regular May meeting, the chapter took part in the Armed

CHAPTER NEWS

Forces Day luncheon meeting sponsored by the Cleveland Advertising Club at the Hotel Carter ballroom on May 19th.

Decatur

The current officers of the Decatur Chapter are: Robert C. McMurtrey. president; Earl L. Chrisman, 1st vice-president; Kenneth C. Colman, 2nd vice-president; Edward C. Whitcomb. secretary-treasurer.

At its April 27th meeting the chapter voted to send Edward C. Whitcomb and Sherman F. Hickman as delegates to the AFCA national convention in New York.

President McMurtrey informed the group of the plans being made for a chapter meeting in July at the time of the Signal Depot commanders' conference in Decatur.

Captain Kenneth Colman then presented motion pictures of the highlights of the 1949 World Series baseball games.

European

Major General Jerry V. Matejka, chief of the EUCOM signal division, and Colonel David C. G. Schlenker, USAFE director of communications, were the principal speakers at the annual meeting of the European Chapter held in Frankfurt on April 14th.

Lt. Colonel Steve J. Gadler, chapter president and chief of the USAFE supply control division, presided at the meeting which followed a dinner at the Frankfurt Casino.

New officers were elected for the ensuing year as follows: President—Col. I. P. Doctor; vice-presidents—Col. E. Blair Garland and Mr. George A. Spear; treasurer—Mr. H. E. Aldridge; secretary—Mr. C. E. Laurendine.

Far East

Lt. Col. Roy F. Blackmon, the Far East Chapters able secretary, was transferred on June 1st and will report to the Command and General Staff College, Fort Leavenworth, in September. Lt. Col. Luster R. Kleinknight, Executive Officer, Signal Section, GHQ, FEC, has been chosen to succeed Col. Blackmon as chapter secretary.

Some fifty members of the Tokyo Post met on March 27th at Club 21. The guest speaker was Commander H. L. Haskell, communications officer Naval Forces Far East, who talked on "Signalling in the Navy."

Fort Monmouth

Col. James D. O'Connell, chapter president, introduced Col. George P. Dixon, AFCA Executive Secretary, who addressed the April 12th meeting of the Fort Monmouth Chapter, and then called on Col. William F. Atwell who outlined the second day of the annual convention at Fort Monmouth on May 13th.

Colonel Dixon talked on AFCA overall membership problems and the need for additional group members in the association. He emphasized the importance of the chapter president since he, together with the executive committee and other committee chairmen, is responsible for the activities of a successful chapter.

The Executive Secretary also stated that a representative of the office of the Chief Signal Officer was touring the ROTC in the midwest and southern areas where he would speak on the AFCA at sixteen universities to the Signal Corps ROTC. It is expected that several additional student chapters may be formed in the near future. There was general discussion of the chapter presidents' conference agenda, followed by a short recess for refreshments.

Colonel Atwell briefed the group on the program of events scheduled for the AFCA convention at Fort Monmouth.

Entertainment by the Post Special Services and a general get-together followed the meeting. Maj. General Francis Lanahan and Brig. General Harry Reichelderfer and other staff personnel attended the meeting.

Lt. Col. R. H. McAteer (seated right), Pres. of Kentucky chapter presents charter to Capt. S. A. Cisler, Pres. of recently organized Louisville-Fort Knox sub-chapter. Standing: Hunter Green; Capt. M. C. Croft; Capt. C. W. Nielsen; C J. Yates; Clyde Burke, Secy. Kentucky chapter; Lt. Col. C. F. Fiore, Fort Knox.

Kentucky

Eighty-five members and guests of the Kentucky Chapter took part in an all-day trip to Fort Knox on April 14th. Cars left Main Street and Ashland Avenue in Lexington at 7:45 A.M. and arrived at the communications department of the Armored School at 11:30 A.M. Following luncheon in the Armored School cafeteria, the party was conducted on a bus tour of Fort Knox, the Gold Depository, the Armored School and the General Patton Museum.

The communications department of the Armored School exhibited the very latest in communications equipment, some of which was demonstrated during the visit. This school offered for inspection a great deal of interesting equipment which has been developed since the close of World War II.

At the close of the tour, the group assembled at the country club for a cocktail hour and dinner. During the business meeting which followed the charter of the new Louisville-Fort Knox Sub-chapter was formally presented to its first president, Capt. Stephen A. Cisler, Jr., of station WKYW, by Kentucky Chapter President R. H. McAteer.

New York

Brig. General Raymond C. Maude, assistant chief of the Air Force development division, was guest speaker at the March 22nd meeting of the New York Chapter held at the 71st Regiment Armory. He discussed the mission and organization of the development division of the Air Force and reviewed some of the operations during World War II which led to the present emphasis on development activities in the Air Force.

"We feel that the one national resource in which we may maintain world superiority is in our technology and in the application of this technology to the national defense," General Maude said. "This technical superiority can only be maintained through the closest relationship of industry, research organizations and institutions, and the armed forces. We will always want to depend on scientific and research organizations such as our universities for the preponderance of basic research. In the field of applied research and development the armed forces must, however, play a leading role. The Air Force is responsible for establishing military requirements in terms of desired characteristics for weapons systems. Last May, General Fairchild conducted what we now refer to as the Air Force-Industry

Col. D. C. G. Schlinker speaking at AFCA European Chapter dinner Others L to R are: Lt. Col. Steve J. Gadler, Hq, USAFE, president of the chapter; Maj. Gen. Jerry J. Matejka, EUCOM chief signal officer; and Chase Laurendine.

CHAPTER NEWS

Intereeptor Conference. For the first time, the Air Force invited key individuals representing the civilian technical resources of the nation to a presentation of our needs. The better part of two days was spent in analyzing the problems we faced in the field of continental air defense. We disclosed to the greatest extent possible the military, social, and economic factors which we considered pertinent and we then took Industry into active partnership to help us in finding the best answer that the state of the art could provide."

General Maude concluded his address with the following: "To a greater degree than ever before, we plan to solicit the active partnership of the civilian technical competence of this nation. You must provide the link between the needs of the uniformed services and the civilian scientific world. Your continuing awareness of the problems of national defense is the basic tool for creating the technical superiority we so sorely need. Officers in the military services can plan, study, analyze, and test weapons systems of tomorrow, become proficient in their application and provide operating personnel. But you, the aware and informed citizens, translating your technical competence into the application of technology to warfare and your social consciousness into political action which preserves an adequate force for national security, must furnish the broad base on which a modern Air Force is erected. Nothing less than this enlightened partnership of science and the military will suffice to uphold our way of life and our survival as a nation."

Chapter President Thompson H. Mitchell, of RCA Communications, introduced a number of well-known members in the communications field. They included: Maj. Gen. Harry C. Ingles, former Chief Signal Officer of the Army and now president of RCA Communications; Col. George P. Dixon, formerly of the Bell System and the IT&T Corp. and now national executive secretary of the AFCA; George W. Bailey, executive secretary of the IRE and president of the ARRL; Captain Roy W. M. Graham, USN, chief of staff of the Eastern Sea Frontier; Colonel Hobart R. Yeager, USAF, communications officer of the First Air Force; Rear Admiral S. F. Patten of DuMont Television; Dr. H. H. Beverage, radio engineer and inventor; D. F. McClure, asst. vice president, New York Telephone Co.

The meeting concluded with the showing of three new Air Force training films. The first two, entitled "Air Power," showed the development of combat aircraft and its fire power. The story of atomic energy was depicted in the last film.

* * *

At its meeting on April 19th the chapter concluded arrangements for its role as host to the AFCA annual convention. Brig. Gen. A. W. Marriner of the IT&T, chairman of the chapter's convention committee, gave a full report on the plans for the convention at the Hotel Commodore on May 12th.

After dinner, Chapter President Mitchell introduced the guest speaker, Major H. L. Roberts of the Signal Corps Photographic Center. Major Roberts spoke briefly of his various experiences in making motion pictures during the past war. He then showed a new 1950 training film just released, entitled "The Ionosphere and Its Effect on Radio Propagations." This film consisted of animated cartoons depicting the effects of sky-wave propagations and the ionosphere on long distance radio communications.

Philadelphia

The absolute dependence of all components of peace-time as well as wartime society upon communications was stressed in an address by Brig. General Hugh Hester before the Philadelphia Chapter on March 30th.

The business of the meeting was devoted to a discussion of the proposed agenda for the chapter presidents' conference to be held at the AFCA convention on May 12th, which was submitted to each chapter by the AFCA Executive Secretary.

A film entitled "Industrial Mobilization" concluded the program for the evening.

* * *

Colonel George W. Goddard, director of photography and research development at the Air Force center, Wright Field, Ohio, gave a demonstration-lecture on the Air Force's tri-dimensional photography show before a capacity audience at the chapter's May 2nd meeting in the Franklin Institute.

Colonel Goddard described a camera capable of taking clear pictures from a low flying airplane going 3,000 miles an hour, if such a speed were attainable. The camera uses moving film, doing away with the conventional type of shutter, and "makes an exceedingly sharp picture." "On a recent test," he said, "a jet plane at 500 miles an hour flew over a man holding playing cards, passing only 50 feet over his head. The picture was so sharp you could read the ace of spades."

The Air Force photographic officer told of other products of Air Force research, including photo-flash bombs for taking pictures from 40,000 feet at night that are "so good it is difficult to tell them from pictures made in daytime." Another new camera detects camouflage by using two layers of film, one an infra-red film that records only natural vegetation, and a second layer that picks up imitations. Distortion of wide-angle shots is being overcome, he said, by photographing on the inside of a spherical glass plate instead of on flat film. With this, a picture can cover 750 square miles from an altitude of 40,000 feet.

Colonel Goddard revealed the use in the Okinawa invasion of a camera that gauges the heights of obstacles on a beach and the depth of water up to 30 feet.

Pittsburgh

Members of the Pittsburgh Chapter were guests at a lecture in the Mellon Institute auditorium on April 17th when Stewart L. Bailey discussed ultra-high frequencies and color television. The meeting was sponsored by the AIEE, IRE and ESWP.

Sacramento

The U. S. Geological Survey photogrammetric laboratory in Sacramento was the scene of the chapter's meeting on February 28th. In layman's language "photogrammetry" is defined as the science of preparing detailed contour maps from aerial photographs. By the use of this process, the U. S. Geological Survey is presently engaged in the preparation of topographical maps of the United States and its possessions.

CHAPTER NEWS

The Sacramento laboratories perform that phase of the operation pertaining to the Western United States, Alaska and Hawaii.

Approximately one hundred members and guests of the chapter were conducted through the photogrammetric laboratories in small groups of six or eight at a time, thus enabling them to view at close range the intricate processes involved in the piecing together of these gigantic jig-saw puzzles. Scientific production line methods are employed in the preparation of these valuable and minutely accurate maps. Individual members of each group were given an opportunity to ask questions and to operate the various instruments and equipment involved, i.e., stereographic plotting machines, multiplex machines, copy cameras, etc.

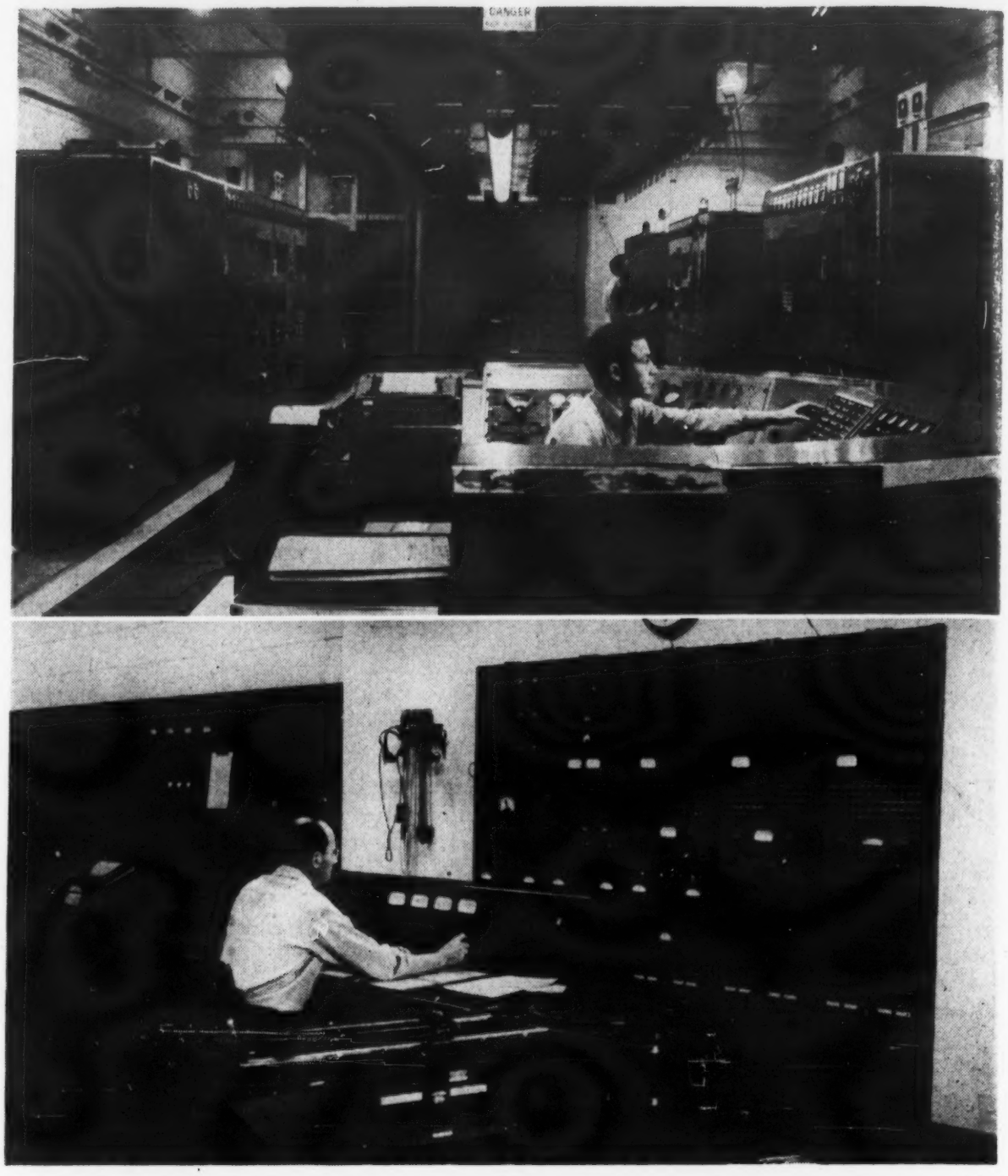
Arrangements for this tour were made by Paul E. Shaad, chairman of the chapter's program committee. The program was made possible through the courtesy of C. A. Ecklund, Pacific regional engineer, and D. H. Rutledge, chief, photogrammetric section, U. S. Geological Survey.

The fine work of the chapter's program committee was again evident in the April 13th meeting which featured a tour of three world-wide broadcasting stations located within a few miles of each other in the open country near Dixon, California. Seventy-five members and guests met at The Milk Farm on Ruote 40 for dinner and then formed into groups for the tour.

The AT&T station placed on the air in 1931 is a radio-telephone broadcasting station and is in communication with trans-Pacific points as well as ships at sea. The station is served by sixteen transmitters of varying capacities and has 23 rhombic directional antennas. The method of scrambling and unscrambling messages, which insures privacy of conversation, was described.

The NBC station placed in service in 1942 is the western outlet for the State Department's "Voice of America" covering South America, South Pacific, the Orient and Alaska. The rhombic antenna there are mounted on towers 190 feet in height. The group was permitted to listen in on some of the programs going through, which are largely entertainment. The extensive banks of transmitters are very interesting and are so installed that visitors may view the usually hidden parts.

The third station visited was the U.S. Naval Station which was placed in serviec in 1949. It is strictly a working station and serves as a back-up station for the more important naval center at Mare Island Navy Yard in Vallejo, California, in serving the Western World including naval ships at sea and Alaskan ports. It is very modern in every respect and has extensive switching equipment for connecting any transmitter with any one of the 15 directional antenna.



Upper: U. S. Navy communications station, Dixon, Calif. Lower: NBC overseas broadcast station, Dixon, Calif.

San Francisco

On March 31st the newly reorganized San Francisco chapter met at the Don Lee station of KFRC for the purpose of adopting a constitution and electing officers for the ensuing year.

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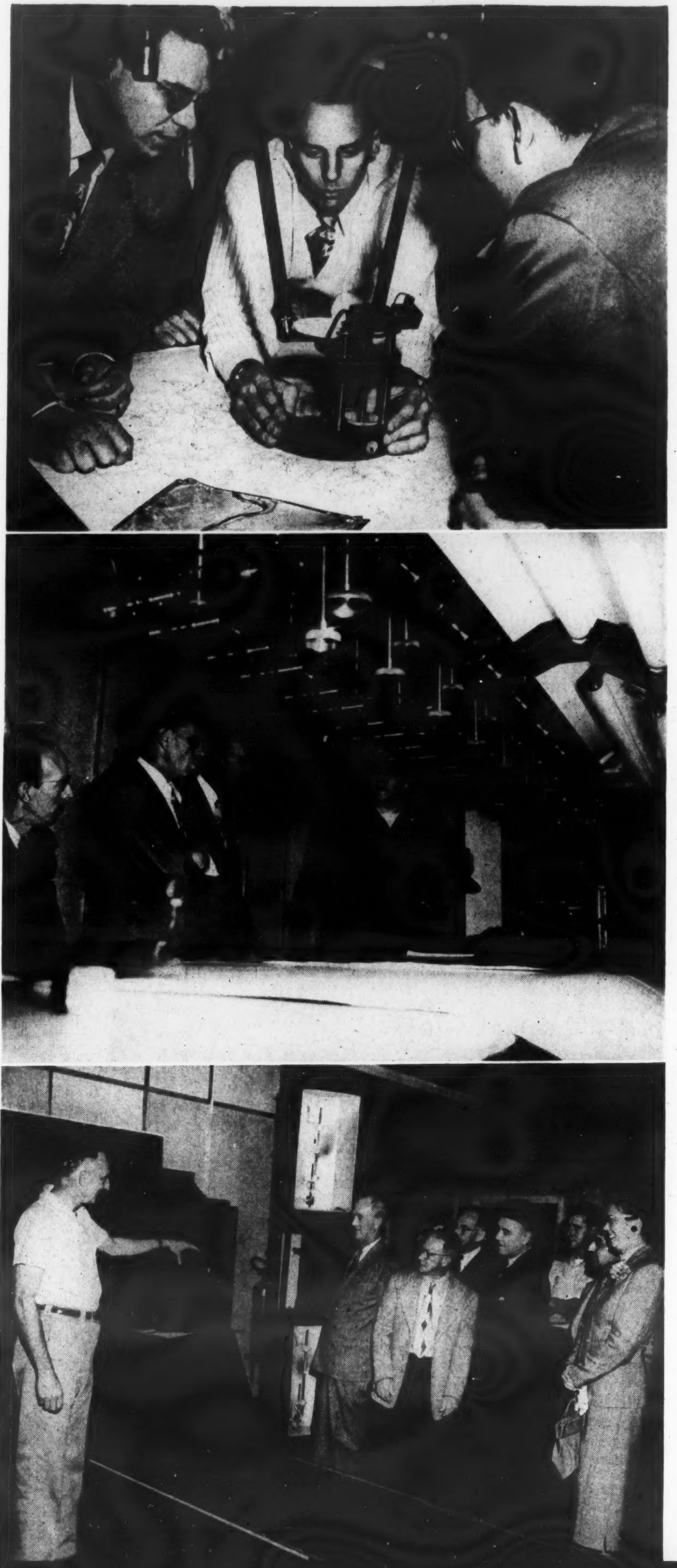

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A simulated vessel equipped with a radiation system producing the same electrical characteristics as found aboard ship was used for demonstrating the types of antenna-ground systems and insulation arrangements, etc. Mr. Kerr said that the compact design and light weight plus durability and reliability has made this radio equipment popular. Another feature of Pan American Radio he mentioned was their interchange service, whereby exchange equipment can be economically shipped by air express to its destination cutting service time to a minimum.

CHAPTER NEWS

The Sacramento laboratories perform that phase of the operation pertaining to the Western United States, Alaska and Hawaii.

Approximately one hundred members and guests of the chapter were conducted through the photogrammetric laboratories in small groups of six or eight at a time, thus enabling them to view at close range the intricate processes involved in the piecing together of these gigantic jig-saw puzzles. Scientific production line methods are employed in the preparation of these valuable and minutely accurate maps. Individual members of each group were given an opportunity to ask questions and to operate the various instruments and equipment involved, i.e., stereographic plotting machines, multiplex machines, copy cameras, etc.

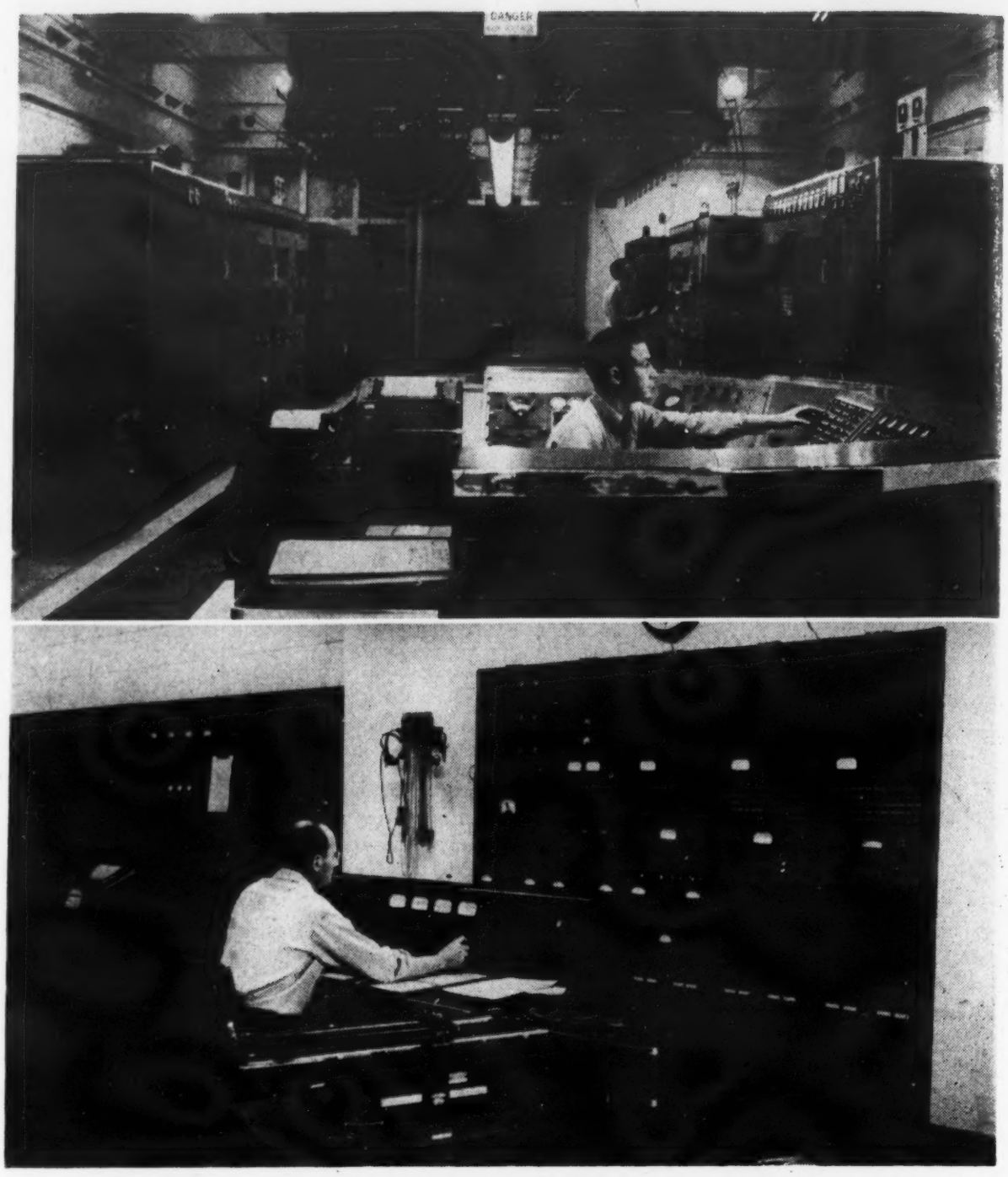
Arrangements for this tour were made by Paul E. Shaad, chairman of the chapter's program committee. The program was made possible through the courtesy of C. A. Ecklund, Pacific regional engineer, and D. H. Rutledge, chief, photogrammetric section, U. S. Geological Survey.

The fine work of the chapter's program committee was again evident in the April 13th meeting which featured a tour of three world-wide broadcasting stations located within a few miles of each other in the open country near Dixon, California. Seventy-five members and guests met at The Milk Farm on Ruote 40 for dinner and then formed into groups for the tour.

The AT&T station placed on the air in 1931 is a radio-telephone broadcasting station and is in communication with trans-Pacific points as well as ships at sea. The station is served by sixteen transmitters of varying capacities and has 23 rhombic directional antennas. The method of scrambling and unscrambling messages, which insures privacy of conversation, was described.

The NBC station placed in service in 1942 is the western outlet for the State Department's "Voice of America" covering South America, South Pacific, the Orient and Alaska. The rhombic antenna there are mounted on towers 190 feet in height. The group was permitted to listen in on some of the programs going through, which are largely entertainment. The extensive banks of transmitters are very interesting and are so installed that visitors may view the usually hidden parts.

The third station visited was the U.S. Naval Station which was placed in serviec in 1949. It is strictly a working station and serves as a back-up station for the more important naval center at Mare Island Navy Yard in Vallejo, California, in serving the Western World including naval ships at sea and Alaskan ports. It is very modern in every respect and has extensive switching equipment for connecting any transmitter with any one of the 15 directional antenna.



Upper: U. S. Navy communications station, Dixon, Calif. Lower: NBC overseas broadcast station, Dixon, Calif.

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NEWS—SERVICES and INDUSTRY

GENERAL

Korea Fight Points Up Communications Needs

The importance of communications-electronics in warfare has been sharply accented in the Korean fight. Signal troops were the first of U. S. forces to land in South Korea, and a shortage of communications-electronics personnel in all U. S. armed services was increasingly apparent as the emergency developed. The deficiency in numbers of such personnel points up what leaders in the AFCA field have repeatedly stressed—that there would be such a shortage, and that the AFCA could be made a useful medium for bringing about an increase of students entering this field.

$28 Million Increase In 1949 Govt Radio-Radar Use

Sales of radio transmitting and communications equipment, including radar, to the U. S. Government in 1949 increased by more than $28 million over the previous year's sales, the Radio Manufacturers Association reports. Federal purchases of transmitter equipment in 1949 totaled $141,288,869, according to RMA member-companies.

Radar apparatus, including search, navigational and fire control, constituted $97,798,244 of the total government transmitter purchases during the year. Sales to the government of communications transmitting and receiving equipment aggregated $24,419,784 and radio navigational aids purchases by the government amounted to $9,140,988.

Other transmitter apparatus sales to the government were as follows: sonar, $1,209,611; laboratory and test equipment, $8,600,031; and piezoelectric quartz crystals, $120,211.

U. S. Committee Meets In Work Review

The policy committee of the United States preparatory group drafting the nation's position in the September extraordinary administrative radio conference, slated to meet at The Hague, met at the State Department in Washington May 11 to review the work of various committees on the allocation of bands of frequencies.

The meeting, which was called by Francis Colt deWolf, chief of the State Department's telecommunications policy staff and chairman of the policy committee, reviewed the committee's work in the bands allocated to the fixed, aeronautical, high frequency broadcasting and maritime radio services.

At the same time, the State Department transmitted letters to the U. S. government agencies and communications companies asking them to transmit to the Department their proposed delegates and representatives to the conference. The U. S. delegation is expected to be a relatively small one, since the Hague conference will last for a considerable period, probably six months or more.

New Bid Terms Allow Partial Orders At Full Bid Prices

A revised set of standard contract forms for the purchase of supplies and equipment by all government agencies, and general provisions applying to the use of forms, have been put into effect by General Services Administrator Jess Larson.

Manufacturers interested in government contracts should especially note the terms and conditions of the invitation for bids, Form 30, prescribed by GSA, November 1949, and now beginning to be used by all government agencies, including the armed services.

The third sentence of paragraph 1 of Form 30 is specificially pointed out as being important to the bidder's attention. It reads as follows:

***"Unless otherwise provided in the schedule, bids may be submitted for any quantities less than those specified;* and the government reserves the right to make an award on any item for a quantity less than the quantity bid upon at the unit price offered, unless the bidder specifies otherwise in his bid."**

Obviously caution is necessitated, and the bidder to protect himself should state in his bid the unit price he would agree to on orders in smaller quantities.

Among other changes in the requirements on the new forms are: statements on whether fees were paid in obtaining the contract; reduction of contract forms to two types; and consolidation of previous contract provisions into a single set of general conditions.

RMA Elects New President at Meeting; Assn Name Altered

Robert C. Sprague, president of the Sprague Electric Company, was elected president and chairman of the board of the Radio Manufacturers Association at the closing of the RMA's annual convention, June 9, in Chicago. Mr. Sprague, one of the leading radio parts manufacturers in the industry, succeeded R. C. Cosgrove who is completing his fourth term as president of RMA.

The RMA members present also authorized the board of directors to effect a broad reorganization of the association, to expand operations, and to change the organization name to the Radio-Television Manufacturers Association because of the increasing importance of TV manufacturing.

Bond Geddes was reelected executive vice president and secretary of the association and will serve in that capacity until January 31 of this year when he will retire and become a consultant of the association. James D. Secrest, top assistant to Mr. Geddes for the past four years, was voted to succeed Mr. Geddes in his administrative post starting August 1.

Telecommunications Reports.

K. E. Stockton Dead

One of the ablest leaders in the world in the field of international communications, Kenneth E. Stockton, president of the American Cable and Radio Corp., the world-wide cable and radio-telegraph affiliate of the International Telephone and Telegraph Corp., died May 11 of a heart attack in a Hackensack, N. J., hospital at the age of 57.

His death definitely leaves a big void in the international communications field in the United States not only in connection with his own company and the I. T. & T. organization, but also in the entire American international telegraph industry. He was extremely capable in this sphere and was highly respected by all in the field throughout the world.

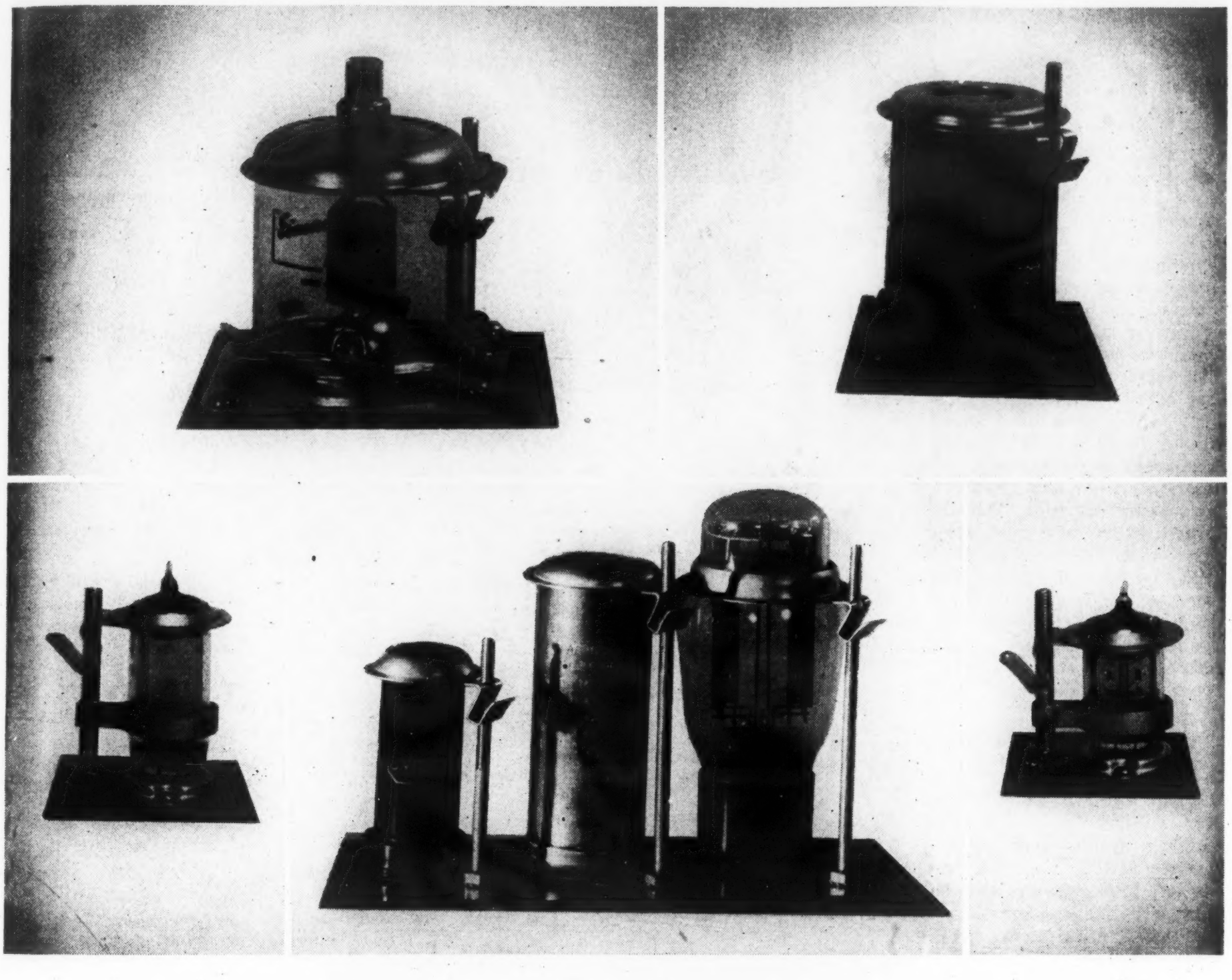
With a brilliantly analytical mind and a straightforward and thoroughly honest approach, Mr. Stockton had been a chief proponent of the creation, in the event of an international telegraphcommunications merger, of a company seperate from the domestic telegraph system. He had presented these views always in a most forceful and frank manner, since this issue was posed, in discussions with members of the Senate Interstate Commerce Committee and to the communications policy board of President Truman, headed by Dr. Irvin Stewart, and in the 1949 annual report of his company. It was believed that Mr. Stockton supported always issues of national import from a totally unselfish point of view.

Having had a quarter century of service with the International Telephone and Telegraph Corp., more than half of it with important executive responsibilities in Europe, Mr. Stockton was one of the best informed executives in the I. T. & T. organization. He had

THIS DEPARTMENT'S PRINCIPAL SOURCE

Telecommunications Reports — **Roland C. Davies, Editor, National Press Building, Washington, D. C.**

Keep your "Plug-ins" plugged in with Top Hat Retainers



New stainless steel clamps for plug-in units subject to vibration.

Materials and finishes comply with Armed Forces specifications.

Recommended for use in military electronic equipment.

Write for circular covering complete line of Top Hat Retainers.

TIMES FACSIMILE CORPORATION

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played a leading role in the formation of most of the I. T. & T. manufacturing companies in Europe. He drafted the contracts for many of the I. T. & T. European and foreign manufacturing affiliates while he was in the legal department of the company, and also took part in the legal phases of the establishment of the I. T. & T. Spanish and Rumanian telephone operating companies, which had been purchased by those governments, respectively, before the war.

Mr. Stockton came to the presidency of the American Cable and Radio Corp. in March, 1948, especially well equipped to take the helm of that company and its operating subsidiaries, the All American Cables & Radio Inc., Commercial Cable Co. and Mackay Radio and Telegraph Co., because he combined both direct-to-the-point legal capabilities and a most comprehensive knowledge of communications operations and problems from actual experience and responsibilities.

Before the war he had spent 15 years in Europe in connection with the I. T. & T. operations in communications manufacturing and telephone service in that continent and then from 1940 to early 1945 upon his return to the United States he served as chairman of the executive committee of the American Cable and Radio Corp. when it was first organized. After V-E Day, he returned to Europe as European divisional vice president of I. T. & T. from 1945 to 1948 and directed not only the complete cooperation of the I. T. & T. manufacturing companies in England, France and Belgium with the Allied forces but also the rehabilitation of the plants on the Continent.

Ellery W. Stone Elected President of AC&R Corp.

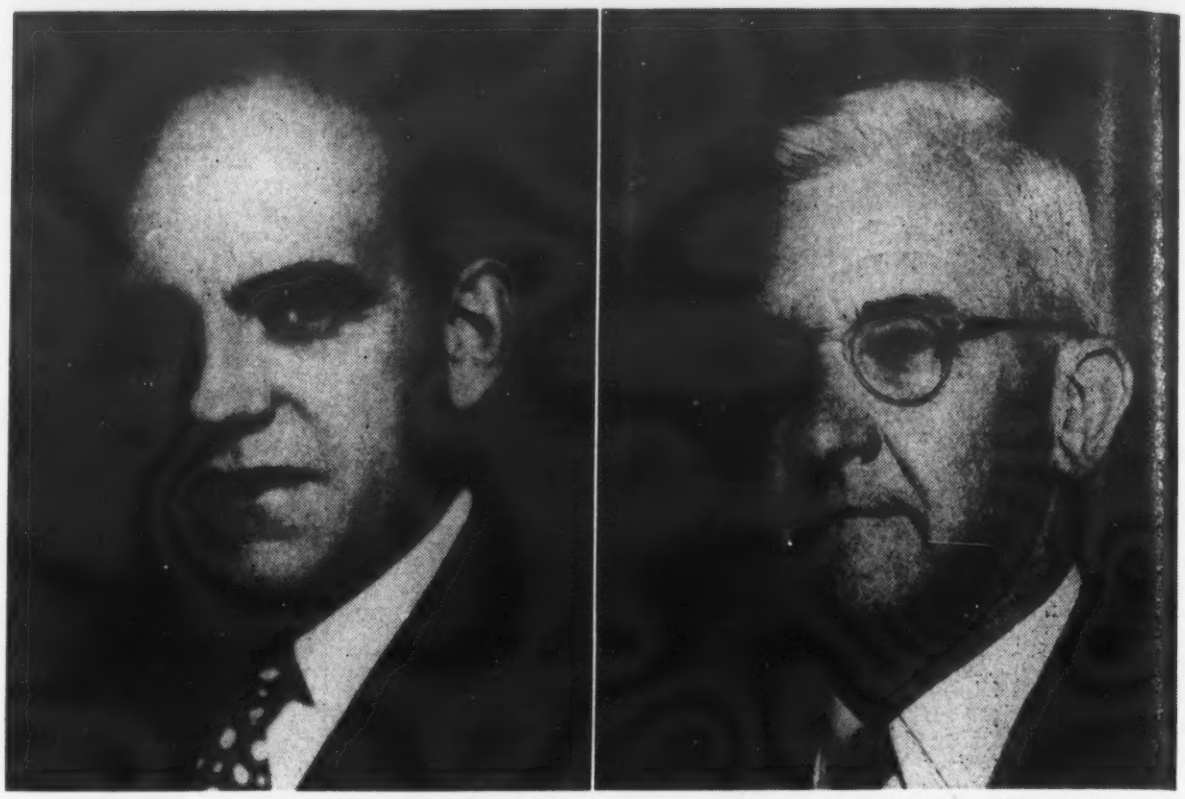
Rear Admiral Ellery W. Stone has been elected president of the American Cable & Radio Corp., succeeding the late Kenneth E. Stockton. (See above.)

With his comprehensive background in international communications it is felt that Admiral Stone will be a strong figure in any future international merger. The new AC&R president has spent most of his career in the telegraph communications field and also has a thorough grasp of worldwide conditions and a wide acquaintanceship among leading officials of foreign governments, especially Europe.

Admiral Stone had been a vice president of I. T. & T. Corp. since May, 1947 and a director since 1948. Earlier he had served as president of the Federal Telephone & Radio Corp. and the Capehart-Farnsworth Corp., the I. T. & T.'s domestic manufacturing affiliates, and of the International Standard Electric Corp., I. T. & T.'s worldwide manufacturing and communications - radio equipment sales concern.

During World War II Admiral Stone served as chief commissioner of the Allied Control Commission for Italy from 1944 to 1947. He had been recalled to active duty by the Navy in 1943 with the rank of captain, and prior to his post in Italy he had served as chief of staff to Vice Admiral William Glassford at Dakar, East Africa. He was one of the first reserve officers to be promoted to rear admiral of the line.

—Telecommunications Reports.



Harold H. Buttner (left) was recently elected vice president and deputy technical director of the International Telephone and Telegraph Company. Maj. Gen. Roger B. Colton (Sig. Corps, ret.) was appointed to Mr. Buttner's former position as president of the Federal Telecommunications Laboratories, Inc.

Larger Bid Awards

In recent large bid awards by the military services the *Federal Telephone & Radio Corp.* received a contract from the Navy Department to furnish 53 radio transmitting sets to cost $1,587,603 and the *Federal Communications Laboratory* was awarded a contract for 67 direction finders to cost approximately $500,000.

Signal Corps contracts gave the *General Cable Corp.* two orders for telephone cable totalling $2,456,000, and other awards were made as follows:

***Automatic Electric Company*, for telephone switchboards and components, and miscellaneous parts, $779,239.**

***Maspeth Telephone & Radio Corp.*, reperforator teletypewriter set TC-16, $307,000.**

***Kleinschmidt Laboratories*, teletypewriters sets, AN/PGG-1, $465,556.**

***J. & H. Smith Mfg. Co.*, mast base AB-15/GR, $109,000.**

***Specialty Assembling & Packaging Co.*, tool equipment TE-113, $205,000.**

***John A. Roebling's Sons Co.*, telephone cable WC-453, $147,000.**

***Espey Manufacturing Co.*, general purpose voice radio sets, $145,000.**

***American Measuring Instrument Co.*, radiosonde transmitters, $114,184.**

***Hubbel & Miller*, in one of the largestcontracts was given a procurement award amounting to $2,181,500 for ground meteorological direction finders being procured under an industrial preparedness program. Up to this time *Hubbel & Miller* had been producing these devices on an experimental or research model basis, but that company, one of the smaller radio manufacturng concerns, now is planning to purchase $350.000 in new tools and machinery and expects to start regular production in December.**

Procurement Info Speedup

To give all American businessmen equal opportunities to compete for military and civilian procurement contracts, the Departments of Commerce and Defense with the General Services Administration have developed cooperative programs to speed procurement information to key points throughout the country.

These programs, effective March 15, provide for the speedy transmission of procurement information to 14 Department of Commerce regional field offices and from those offices down the line to approximately 135 additional related offices where businessmen will have direct access to the information.

Under the Defense Department-Commerce Department plan, all of the 55 major Army, Navy, and Air Force purchasing offices in the field and in Washington will, at the close of business every day, airmail to the Commerce Department's 14 regional offices and its Small Business Division in Washington, a synopsis of each inviation to bid approved that day. The synopsis will include a brief but adequate description of the item to be procured, quantity to be purchased, the invitation number and place and date of bid opening or issuance. Copies of the complete bids listed in the synopses will be kept on open file in the regional offices for anyone to see.

Regional offices will consolidate and reproduce the synopses and redistribute

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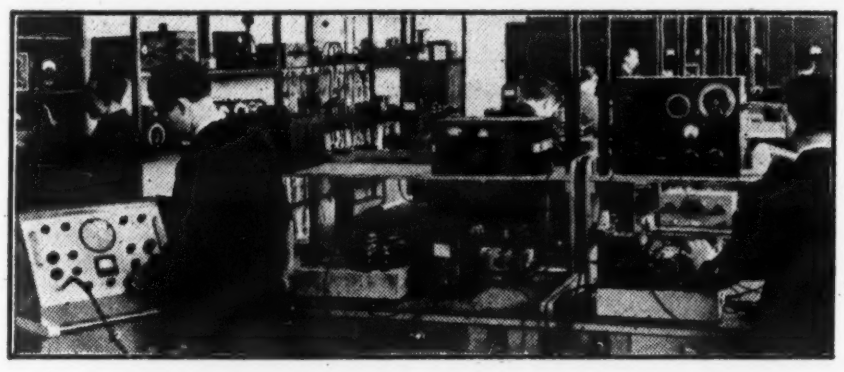
You get all the benefits of an experienced, integrated, all inclusive electronics service — when you work with Sherron. This definitive service includes . . . research and development in our electronics and electro-mechanical laboratories right through sheet metal fabrication in our block-long plant.



At the top of the Sherron personnel pyramid are physicists with electronic knowledge who will provide the necessary research for your project . . . electronic and mechanical engineers who will develop it...technicians who will accredit its workability. These men work hand in hand with our production engineers, who have at their command the necessary sheet metal fabrication facilities and manpower to turn out a finished prototype . . . ready for you to manufacture. Whether we initiate the design — or work from your prints and specifications — our service is confidential.

COMMUNICATIONS

- Transmitter —-Receiver: A.M.; F.M.; P.M.; TV
- Navigational Aids and devices — Homing and Direction Finding Equipment
- Telemetering; Radar; Sonar
- Micro-wave techniques and applications:— Generators; Convertors and complete assemblies

ELECTRONIC CONTROL EQUIPMENT FOR:

- Guided Missiles: Drone Aircraft; Remote Control Devices
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- Velocity Propagation Measurement
- Processing equipment — industrial applications, quality control

VACUUM TUBE CIRCUIT DEVELOPMENT

- New applications for existing and newly developed vacuum tubes
- Precision Test and Processing Equipment for all types of vacuum tubes, laboratory, production or composite

ELECTRONIC MEASURING DEVICES

- Flow indicators:—Liquids, gases, solid components
- Sorting, counting and inspection
- Chemical process control; titration; ionization; diffusion
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- X-Ray, supersonic and radio frequency applications to measurement

INSTRUMENTATION

- DC; AC; Audio; RF; Microwaves; Infra-Red; Visible Spectrum; Ultra-Violet; Soft and Hard X-Ray; Cosmic Radiation
- Vacuum Tube Meters • Null Detectors
- RF; Audio frequency generators • Bridges
- Multi-Wave Shape Generators
- High Gain Amplifiers • Oscilloscopes
- Power Supplies, Regulated, High & Low Level

TELEVISION

- Television Signal Synthesizer
- Shapers; Timers; Delay Circuits
- Air Monitors • Sync Generators
- Field Intensity Equipment

NUCLEONICS

- *Counters* — Geiger-Muller, Scintillation, and crystal types
- *Computers* — Mechanical linkages, complex electrical analogues digital computers
- *Servo-Mechanisms* — Velocity and position control to specified practical accuracy limits
- *Amplifiers* — SHF; UHF; VHF; LF; D.C. to fit any application
- *Oscillators* — All frequencies, audio to the extremely high microwaves
- *Power Supplies* — High & Low power and voltage. D.C. output hum-free to your limits
- *Regulators* — Electronic or electro-mechanical. Regulation, drift, range of control, to your specifications
- *Measurement*—Devices for measurement and control of all parameters capable of being controlled and capable of producing proportional electrical, optical or other physical indication
- *Particle Accelerator Controls* — Grouping of controls, supplementary apparatus, and experimental system into a compact integrated unit

ELECTRO MECHANICAL LAB.

To design, style, develop and manufacture prototypes and high precision mechanical sub-assemblies, or assemblies involving part manufacture and assembly of units incorporating machine elements of bases, springs, levers, shafts, bearings, cams, valves, regulators, drives, transmissions and controls for:

- ELECTRO MECHANICAL TEST EQUIPMENT
- SPECIAL HYDRAULIC UNITS
- SPECIAL MEASURING INSTRUMENTS
- EQUIPMENT FOR NUCLEAR PHYSICS
- SERVO MECHANISMS
- KEYERS & COUPLERS
- DRIVING AND CONTROLLING EQUIPMENT
- REGULATORS
- MICRO WAVE APPARATUS
- MECHANICAL ELEMENTS FOR SPECIAL ATOMIC ENERGY EQUIPMENT
- RADAR MECHANISMS
- COMPUTER MECHANISMS
- MECHANICAL OPTICAL SPECIALTIES
- MECHANISMS OF NAVIGATIONAL DEVICES
- VIBRATION CONTROL MOUNTINGS
- AUTOMATIC SCREW MACHINE PARTS
- PRECISION GEAR TRAINS
- MECHANICAL PORTIONS OF MEDICAL AND OPERATING EQUIPMENT
- MECHANICAL PORTIONS OF ULTRA HIGH FREQUENCY EQUIPMENT

Sherron Electronics

KEZXIE

them to 28 Commerce Department district offices and to approximately 100 cooperating offices including information centers in the 35 unemployment areas known as "E" areas.

The consolidated synopses, which will be available for pickup by the businessman, will provide sufficient information about the material to be purchased to enable him to decide whether he wants to submit a bid. If he decides to do so, he should write to the originating military purchasing office for a copy of the full bid request.

In the Commerce Department-GSA plan, the GSA will make available by airmail to the Department's regional offices a daily summary of anticipated purchases in advance of the time bid invitations are issued. This information will include purchases to be made by the Federal Supply Service in Washington and at 12 field supply centers.

As in the case of Defense Department bid information, GSA summaries will be sent out to the field offices and cooperating bureaus. Thus on a continuing day-to-day basis approximately 150 offices in the United States—geographically located to afford wide national distribution and already well-known to many businessmen—will serve as convenient information centers where businessmen will have easy access to military and civilian procurement bids in sufficient time to compete for the business if they choose to do so.

The Department of Defense said that the military purchasing offices would continue to maintain lists for the mailing of bid invitations, or of advance notices of such invitations, to bonafide manufacturers or dealers.

As a further service, copies of synopses and bids will be retained at the military offices for anyone who wishes to pick them up.

All unsuccessful, as well as successful bidders, will be notified promptly of the outcome of their bids, the Defense Department said.

The plan does not apply to invitations to bids, or awards on classified (secret) contracts. This information will be made available only to properly cleared representatives of concerns invited to bid on classified work.

GSA said that information on proposed purchases of over $500 to be made through formal bid and award procedures, or other written price solicitations, would cover the following GSA buying programs:

1. Open market purchases to be made upon requisition from the various civilian agencies of the Government. Daily reports will be made when the requisitions are received instead of when bid invitations are issued. By instituting this new method of reporting, GSA advances the lead time from 10 days to two weeks on a large volume of buying. This will be especially helpful to small businessmen who are not on invitations to bid lists, giving them more to obtain, prepare and submit bid forms. Federal Supply Service open market purchases total approximately $50,000,000 a year.

2. Stock replenishment purchases made in Washington and in the field of items which are kept on hand at and are ordered by civilian agencies from the various supply center warehouses. These purchases total approximately $90,000,000 annually.

3. Term contracts calling for indefinite quantities for a definite period of time. These items are listed in the Federal Schedules of Supply and are ordered by the agencies directly from the supplier at the contract price. Purchases from the schedules total approximately $100,000,000 a year.

GSA will also make a daily report of anticipated purchases under $500 but not less than $100, so that information on small lot purchases will be available to the small businessman located near the supply centers where these purchases are to be made.

When formal bids are issued by GSA they will be available at Commerce regional offices for examination by prospective bidders.

Field offices of the Department of Commerce are located in the following 42 cities (asterisks indicate regional offices):

Albuquerque, New Mexico
*Atlanta, Georgia
Baltimore, Maryland
*Boston, Massachusetts
Buffalo, New York
Butte, Montana
Charleston, South Carolina
Cheyenne, Wyoming
*Chicago, Illinois
Cincinnati, Ohio
*Cleveland, Ohio
*Dallas, Texas
*Denver, Colorado
Detroit, Michigan
El Paso, Texas
Hartford, Connecticut
Houston, Texas
Jacksonville, Florida
*Kansas City, Missouri
*Los Angeles, California
Louisville, Kentucky
Memphis, Tennessee
Miami, Florida
Milwaukee, Wisconsin
*Minneapolis, Minnesota
Mobile, Alabama
New Orleans, Louisiana
*New York, New York
Oklahoma City, Oklahoma
Omaha, Nebraska
*Philadelphia, Pennsylvania
Phoenix, Arizona
Pittsburgh, Pennsylvania
Portland, Oregon
Providence, Rhode Island
Reno, Nevada
Richmond, Virginia
*St. Louis, Missouri
Salt Lake City, Utah
*San Francisco, California
Savannah, Georgia
*Seattle, Washington

Brig. Gen. Thomas C. Rives—appointed to General Electric staff. See story, page 58, col. 2.

Names and addresses of the cooperating offices can be obtained by local businessmen from their nearest field office.

Agreements formalizing the new plan were signed March 15, in Room 3-E-912, Pentagon Building.

The agreement between the Department of Defense and the Department of Commerce were signed by Assistant Secretary of Defense Paul H. Griffith and Acting Secretary of Commerce Cornelius V. Whitney. The Department of Commerce-General Services Administration agreement were signed by Acting Secretary of Commerce Whitney and Deputy Administrator of General Services Administration Russell Forbes.

Other officials who were present included:

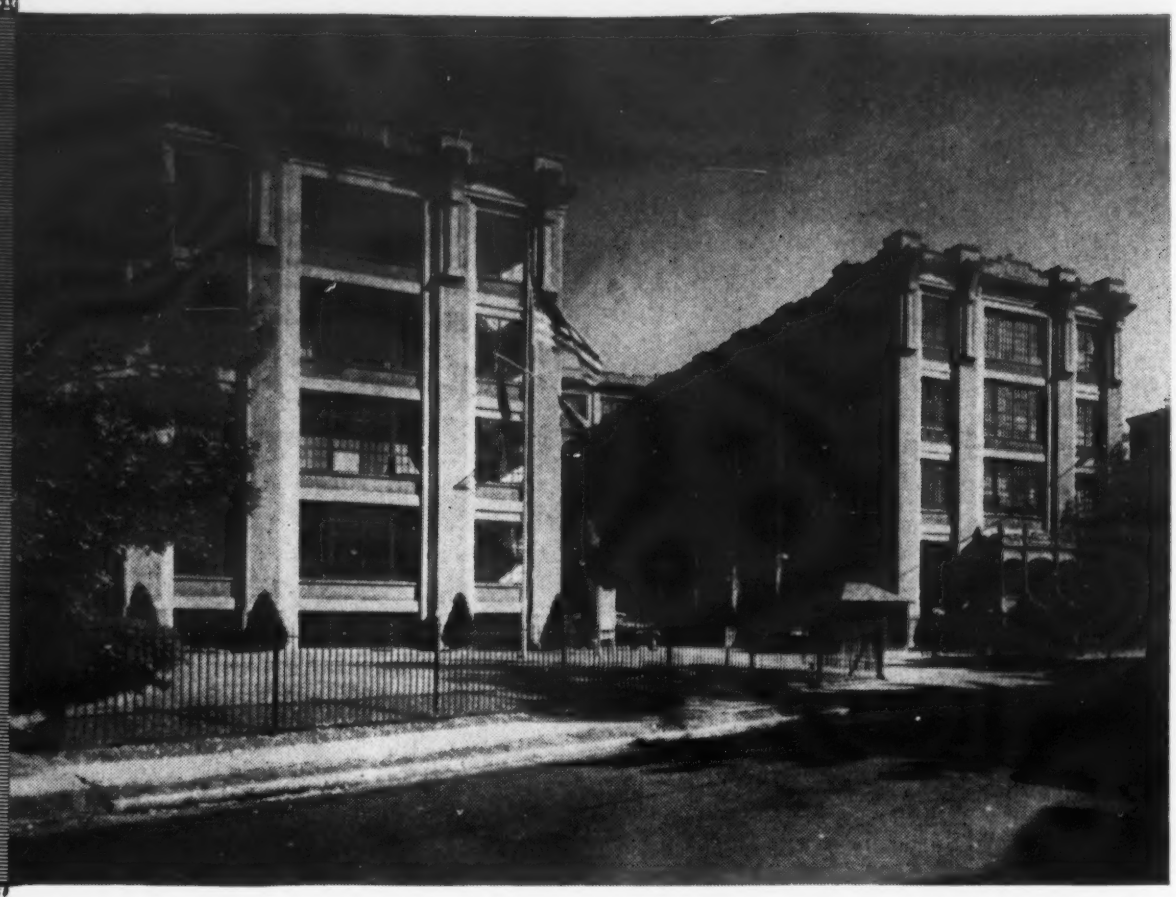
Department of Defense, Munitions Board: Rear Admiral Morton L. Ring, Director for Military Supply; Colonel A. B. Denniston, Chief, Office of Procurement Methods; and Commander R. F. Ashler, Chief, Small Business Office.

Department of Commerce, Office of Domestic Commerce: H. B. McCoy, director and James L. Kelly, deputy director; Charles F. Hughitt, chief, Small Business Office; Carlton Hayward, director of the Field Service; B. K. Slaughter, chief of procurement section, Office of Small Business; George W. Grimsley, liaison officer with civilian agencies.

"Ham" Field Day

Using disaster operating techniques, thousands of the nation's "hams" set up self-powered portable equipment under simulated emergency conditions to take part in the Fourteenth annual Field Day of their national association, the Americsan Radio Relay League, on June 24-25.

Participating in radio club groups, or as individuals, amateur operators at-



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testing devices

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W. E. DITMARS
President

Division of The GRAY MANUFACTURING COMPANY • Originators of the Gray Telephone Pay Station and the Gray Audograph

tempted to contact as many other amateur stations as possible, both home and portable stations. Reports were exchanged and emergency-type messages relayed. Also active in the field day were mobile stations, equipment permanently installed in the amateurs' cars, and available for instant emergency use.

Selecting the most isolated spots they could find to closely parallel conditions which might be encountered in actual emergency, amateurs used transmitters powered independently of commercial mains — by gasoline-engine generators or batteries — and principally of less than 30 watts power (one-half that required by the ordinary electric light bulb). As many as eleven complete transmitter-receiver installations were operated simultaneously from individual locations.

This "dress rehearsal" was part of a nationwide program of preparedness for radio amateurs to fit themselves and their equipment for the role of furnishing emergency communications when needed. The ARRL Emergency Corps is composed of thousands of amateur operators who stand ready with their equipment to step into the breach when normal communication channels fail in the event of disaster.

Ike's View on Radar

Undoubtedly the top planners of national defence in the armed services especially the Air Forces and the Army, felt that General "Ike" Eisenhower performed a real service to the nation in calling the attention of Congress to the necessity for greater expenditures for national preparedness and defensive measures, particularly in the strengthening of the radar network in Alaska and the Pacific Northwest. But Secretary of Defense Louis Johnson commented "the radar network should be the very best available and should not be built under hysteria."

From the attitude of Congressional leaders, especially House Armed Services Committee Chairman Vinson, General Eisenhower's views are likely to prevail. The Air Force is keeping completely secret any plans for the expansion of the radar network.

Ankenbrandt Stresses Need For Ready Communications

Maj. Gen. F. L. Ankenbrandt, Director of Communications of the Air Force, in an address on the global military communications picture before the National War College March 27, stated that the Air Force must have an up-to-date communications system in the outbreak of an emergency because of the increased speeds of modern and future aircraft. General Ankenbrandt said, "With greatly increased speeds in the offing, delays and errors assume increasing importance until they may eventually reach a point where they nullify effectively the advantages gained through the increases in speed." He added that the long lead-time on equipment, shortage of trained personnel, and time required for installation would make it extremely difficult to establish an adequate system after an emergency began.

Mr. F. S. Barton, director of communications, Ministry of Supply, London, England, arrives at Maxwell AF Base, Ala., for at visit to the Air University's air communications and electronic staff officers' course, Gunter AF Base, Ala. Here he is being greeted by Col. Harold W. Grant, school director (left), and Wing Commander Algert D. Jackson, special assistant to the school director. Mr. Barton later gave a classroom presentation on signal developments and trends in the RAF to the students at Gunter.

Improved Radar Technique

An improved technique for generating a variety of highly stable jitter-free subharmonics from a radio frequency source, which may be applied to many radar and navigation systems was the subject of a paper, delivered to a meeting of the Dayton Technical Conference sponsored by the Institute of Radio Engineers, by C. E. Meinheit and T. T. Hill of Sylvania Electric Products Inc.

The new equipment revealed by Meinheit and Hill was described as a unit for the derivation of extremely phase-stable subharmonics of a 100 kc frequency standard signal. Frequency division is accomplished by pulse counting using a mono-stable multivibrator as a pulse gating device. They said that the unit described has maintained precise frequency division over extended periods of time in both field and laboratory applications.

Summing up the advantages of the improved technique, they said, "the circuits used are simple, easily reproductible, and may be operated over a wide range of frequencies and division ratios."

Meinheit, a native of Matteson, Illinois, received his B.S. degree in electrical engineering from the University of Illinois in 1942. During 1943 he was associated with the Sperry Gyroscope Company. From late 1943 until he joined the staff of Sylvania's Physics Laboratory, he served in the Navy as an electronic officer after attending radar schools at the Massachusetts Institute of Technology and Bowdoin College.

Hill, a native of Conway, Arkansas, received his B.S. degree in physics from Hendrix College in 1945 and his B. S. in electrical engineering from the University of Texas in 1948. He also served as an electronic officer in the Navy and attended Navy radar training programs at Bowdoin College. and M.I.T. During 1946 and 1947 he served as an operating engineer for broadcasting station KARK. He joined the engineering staff of Sylvania Electric in 1948 and is now associated with the company's electronics division at Boston, Mass.

Zimmer, Sylvania Exec VP

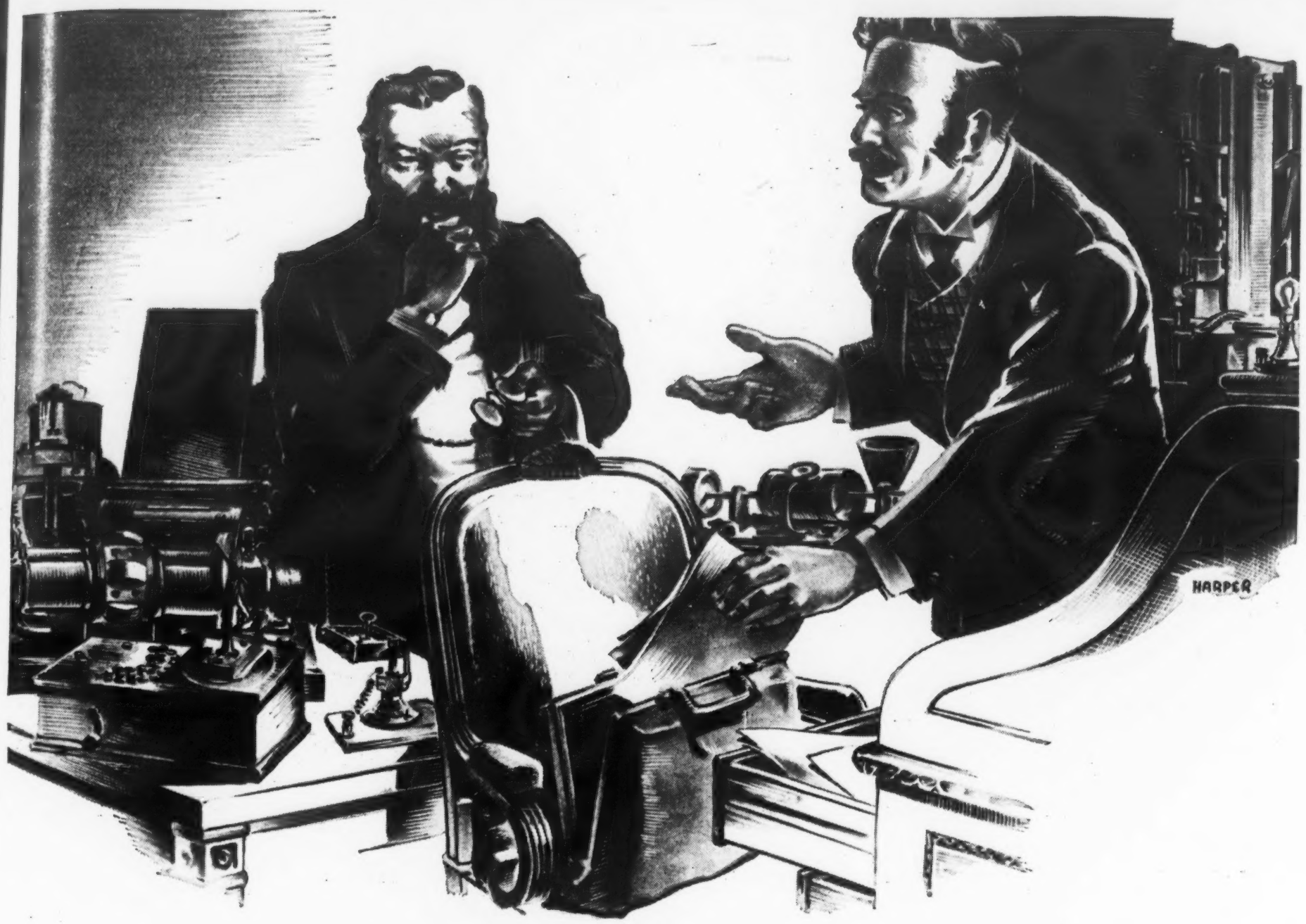
H. Ward Zimmer, who has been Sylvania Electric Products vice president in charge of operations for the past two and a half years, has been elected by that firm's board of directors to be executive vice president of the company.

Mr. Zimmer joined Sylvania in 1919 in the purchasing department from where he went into manufacturing management, becoming general manager of the radio tube division in 1942 and vice president in 1945. He was elected to the board of directors last April.

TV Upsurge Marks Best RCA Year

The continued upsurge of television, which became a $1 billion-a-year business in the shortest time of any new American industry, was primarily responsible for making 1949 the most successful year in the history of the Radio Corp. of America, and the first quarter of 1950 the most profitable three-month period RCA has ever had. Brig. Gen. David Sarnoff, RCA board chairman, reported to the stockholders at the annual meeting May 2.

A record crowd of 1048 stockholders attended the meeting, and greeted General Sarnoff's statement with sustained applause. The length of the meeting, two hours and 17 minutes, also was the



The mistaken young man who quit the patent office . . .

Back in the 1880's, a young man quit the patent office. It was a perfectly good job except for one thing: There wasn't any future in it. You could, as he explained, walk through the place and see for yourself that just about every possible thing had been invented.

He was, of course, just as wrong then as he would be today almost seventy years later. In a world where nothing is impossible and many things are still unknown, progress is limited largely by lack of imagination.

In electronics alone, a "normal" quarter of a century's development has been crowded into the past half dozen years. And patent requirements of this single industry probably equal the total work of the patent office when this mistaken young fellow resigned.

SPRAGUE

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Sprague Telecaps*, the first truly practical phenolic molded paper tubulars, introduced a new era in trouble-free small capacitor performance, whether under "normal" or exceptionally difficult operating or "shelf" conditions.

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Revolutionary new dry electrolytic capacitors to match television's exacting needs are another Sprague pioneering development. Conservatively rated up to 450 volts at 85°C., these long-life electrolytics are outstandingly stable.

Sprague Subminiature Paper Capacitors, hermetically sealed in metal cases with glass-to-metal solder-seal terminals, are designed to be as good as, and often better than, larger units.

longest in the corporation's history. Much of the questioning of shareholders related to TV, particularly the current FCC color television proceeding, at which General Sarnoff testified the following day. The stockholders rejected a proposal for cumulative voting for directors by a ratio of nearly 12 to one.

Directors reelected, each by virtually unanimous votes, were General Sarnoff, Maj. Gen. H. C. Ingles, president of RCA Communications, Arthur E. Braun, and John Hays Hammond, Jr. Mrs. Ruth Bryan Owen Rhode, alternate American delegate to the United Nations, was nominated at the meeting, but drew only about 25,000 votes, as compared to 11.5 million for the reelected directors. General Sarnoff said there is no RCA policy against a woman on the board, and the firm will consider inviting one to serve at a future date.

Discussing television, General Sarnoff said that "after the hearings now being conducted by the (FCC) are concluded, it is hoped that th barrier known as the "freeze" will be lifted in order that new television stations may be added to those now in operation. This action by the FCC would widen the market for receiving sets and increase television as a broadcasting service to the millions of Americans who now live in areas beyond the range of existing stations."

In addition to TV broadcasting, General Sarnoff cited industrial television as a major new field for development. He said that a new small TV pickup tube, known as the Vidicon, developed by the RCA Laboratories Division, makes possible the smaller TV cameras which are preferable for industrial purposes.

Plan for 456-458 MC Use

A statement strongly favoring the proposed rule of the FCC, permitting shared use of 456-458 megacycles by operational fixed stations in the industrial radio service has been filed with the commission by the National Committee for Utilities Radio. The NCUR said that the plan will strengthen the power radio service by permitting control and relay channels in a portion of the spectrum where efficient equipment is readily available; provide greater flexibility in meeting systems coverage problems; and make available spectrum space for control, relay and repeater operations in a band other than 72-75 mc which will not be restricted as to possible interference with television.

Radio Topflight Leaders At Color TV Testimony

There was a veritable "Who's Who in Radio" at the FCC color TV hearings when Brig. Gen. David Sarnoff, RCA Board Chairman, testified May 3 and 4. From RCA, there were President Frank M. Folsom, Chief Counsel and Director John T. Cahill, Vice President and General Attorney J. V. Heffernan, Vice President and Director Charles B. Jolliffe, public relations Vice President Orrin E. Dunlap, Jr., Vice President Glen McDaniel, and Dr. W. Engstrom, in charge of the RCA Laboratories. In addition, Clark Gifford, former assistant to President Truman and new RCA Washington counsel and NBC Vice President Frank M. Russell attended the sessions.

The Columbia Broadcasting System, too, had its top echelon at the proceeding—President Frank Stanton, Executive Vice President Joseph Ream and Washington Vice President Earl Gammons.

Colonel Francis E. Kidwell, Executive Officer of the OCSigO congratulates Sergeant Gordon J. Johnson upon his advancement under the Army's Career Guidance System. Sgt. Johnson has been in the Army nearly six years. He is from Alden, Minnesota.

AT&T Using Philco Relay

The Philco Corp. has supplied the long lines department of the American Telephone & Telegraph Co. with television microwave repeater and terminal equipment for use in the link between Richmond and Norfolk, Va. For this new route of the A. T. & T.'s microwave radio relay system, the Philco equipment is being installed at two terminal and three intermediate repeater stations.

The Philco microwave television relay equipment, which is the same type as was developed by the Philco research and engineering laboratories for the Western Union Telegraph Co. New York to Philadelphia microwave radio beam system, operates in the 6000 megacycle band.

The equipment will provide a single one-way circuit from Richmond to Norfolk. At the three intermediate repeater stations, this equipment is so arranged as to reduce the size of the installation which would be needed if it becomes necessary to serve intermediate points wishing to receive or originate video programs. Philco will mount ten-foot parabolic antennas on the 200-foot buildings of the A. T. & T. long lines department already constructed at these sites on the Richmond-Norfolk route.

The Philco relay equipment utilizes a principle of teter-heterodyne remodulation, which does not require converting the signal-to-video at each repeater point and in this method of operation distortion and interference is minimized. making possible long regional television networks, Philco stated. A complete terminal for repeater equipment is enclosed in a single metal cabinet measuring 24" x 84". The power consumption of the complete unit is less than 1000 watts at 115 volts, 60 cycles.

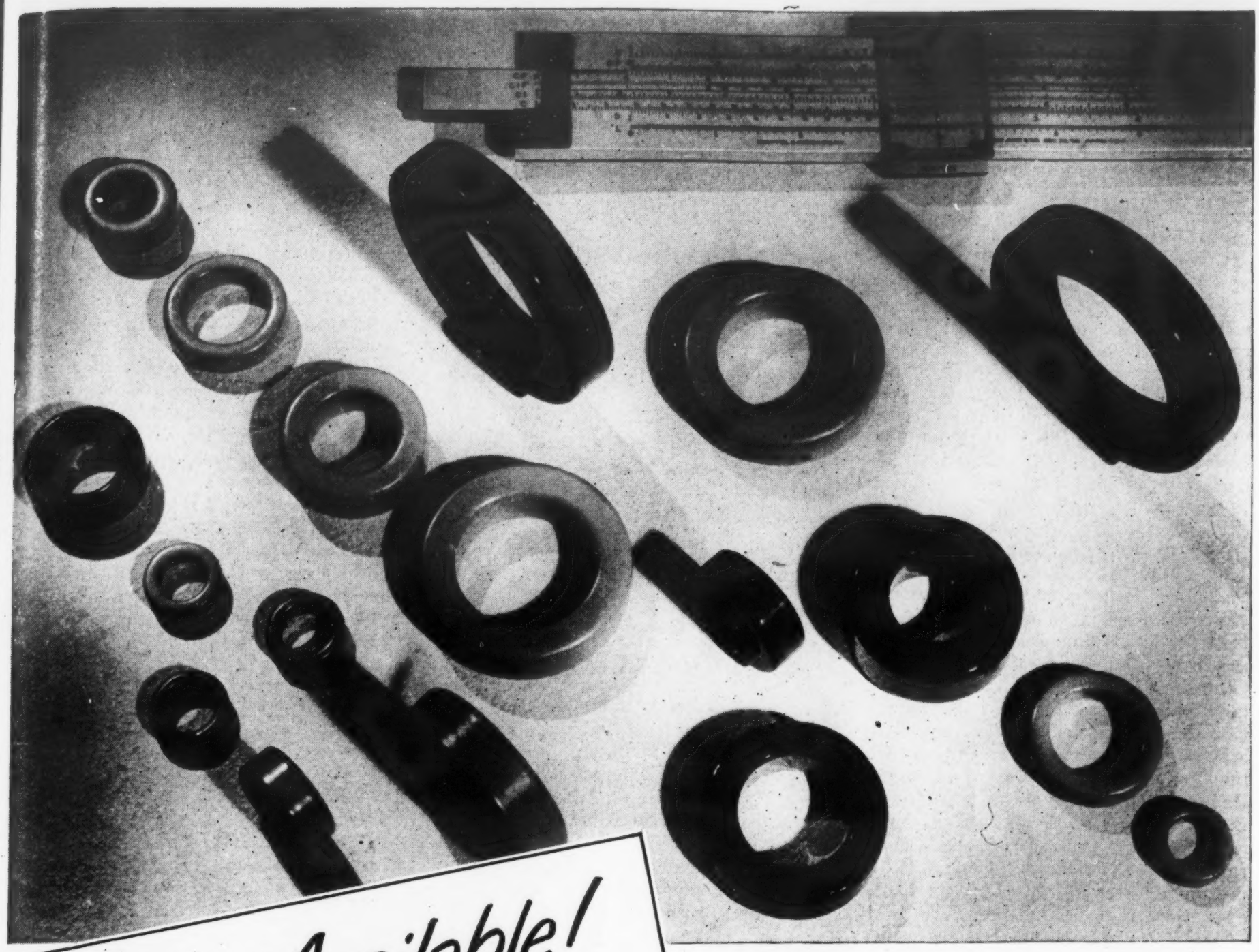
Chief Engineer of Automatic Electric Made Vice Pres.

Kenneth W. Graybill, for the past 12 years chief engineer of the Automatic Electric Company, has been elected a vice president of the company.

As vice president and chief engineer of Automatic Electric, Mr. Graybill will continue to give executive direction to the company's research, development, and patent affairs, and to have staff supervision over manufacturing engineering operations.

Copperweld Has Large Foreign Wire Orders

For the postwar rebuilding of its long distance telephone and telegraph system the Italian Post and Telegraph Administration recently ordered 517,000 pounds of Copperweld Steel Company telephone line wire. Last year more than 3 million pounds of Copperweld wire was supplied to Italy for the same purpose. The latest order also included 75 miles of ½" 7 wire strand for the overhead ground wire to protect the Strait of Messina 220 KV transmission line in Italy.



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HIGH Q TOROIDS for use in Loading Coils, Filters, Broadband Carrier Systems and Networks— for frequencies up to 200 K C

COMPLETE LINE OF CORES TO MEET YOUR NEEDS

- ★ Furnished in four standard permeabilities — 125, 60, 26 and 14.
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- ★ These toroidal cores are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

For high Q in a small volume, characterized by low eddy current and hysteresis losses, ARNOLD Moly Permalloy Powder Toroidal Cores are commercially available to meet high standards of physical and electrical requirements. They provide constant permeability over a wide range of flux density. The 125 Mu cores are recommended for use up to 15 kc, 60 Mu at 10 to 50 kc, 26 Mu at 30 to 75 kc, and 14 Mu at 50 to 200 kc. Many of these cores may be furnished stabilized to provide constant permeability (±0.1%) over a specific temperature range.

** Manufactured under licensing arrangements with Western Electric Company.*

W&D 2930

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More recently a $1 million order was placed with Copperweld by the Post and Telegraph Department of the Union of South Africa. Shipments are already underway on the order which will total more than 25,240 miles of wire weighing 4 million pounds.

Other foreign engineering projects now in progress are expected to result in a large volume of orders for Copperweld products, according to the company's wire and cable division executive vice president, William J. McIlvane. Large quantities of Copperweld wire and cable have been used during the past year in the construction of power and communication lines in Rhodesia. Argentina, Brazil, Venezuela, Mexico, and Canada.

New Lightweight Radar

A new light-weight and less expensive radar for primary use on ferry boats, tugboats and smaller craft which has been developed by the Radiomarine Corp. of America has received FCC approval after extensive tests by the RMCA, it was disclosed at the commission this week. It was understood that other manufacturers, including Raytheon and the British manufacturing concern, Decca, may have under consideration similar lighter weight radar models which would be probably presented later to the FCC for type approval.

The Radiomarine lightweight radar type, model CR-103, which operates on 9320-9500 mc, was the unit which received FCC type approval.

Meanwhile, Radiomarine literally took every hand in the "game" of providing recent radar installations for American shipping. The FCC six grants and two STA's were all RMCA. Installations of RMCA sets were approved for the Great Lakes steamers William Edenborn, Samuel F. B. Morse, John W. Gates, Malieota, all operated by the Pittsburgh Steamship Co.; the motor vessel Rangely of the California (Oil) Co. which plies between shore bases and inshore and offshore drilling centers on the Pacific Coast; and the inland waters tugboat of the American Barge Lines Co., "Trade Winds."

The STA's were granted to the oil tanker, Standard No. 3 and the Atlantic coastal steamer Empire State. The Edenborn and Rangely have approved use of RMCA models CR-103 and the others were CR-101-A.

Crewless Radio Lightship

A remote control radio system, developed by the Westinghouse Electric Corp. and named "Visicode," will shortly be put into use for ocean duty. After tests to check the lightship's reliability, the 91-foot "EXP-99" is scheduled to be put into service aiding navigation for ocean shipping in New York Harbor. The light, radio beacon, and fog signal on the ship will be controlled by the Sandy Hook, N. J., Coast Guard station. Visicode, as explained by Westinghouse Engineer W. A. Derr, uses short radio waves to send orders from the shore station to the ship, where a sensitive receiver picks them up, and activates relays which put into operation a reply signal.

Palmer Receives Award

Dwight R. G. Palmer, president of the General Cable Corp., and a leading figure in AFCA activities, was recently named by the National Urban League to receive the 1950 "Two Friends Award."

The award is presented yearly by the nation-wide interracial social service agency to one white and one colored American "to signalize outstanding instances of interracial teamwork for the good of the American community."

AFCA convention goers of 1947 and 1949 will remember Mr. Palmer as the banquet toastmaster at both of those national meetings.

Army Trains at Navy Center

Electronic and radar training aids for the use of antiaircraft artillery, rifles and field artillery, where shots can be scored automatically without any firing of actual shells or bullets, established by the Navy at its Sands Point, Long Island, N. Y., Special Devices Center, will be used by the Army in training of troops under a joint agreement with the Navy.

New TV Tube Developed By Sperry for Western Union

A significant television development, a new Klystron tube which may be used either as a synchrodyne (to eliminate distortion) or an amplifier, has been developed by the Sperry Gyroscope Co. for the Western Union Telegraph Co. Highlights of the new tube are its power output—five watts at 4000 megacycles in the video transmission channels—and its wide modulation bandwidth .

The new tube is of the triple cavity type, and is reported to have excellent linearity. In the frequency area used for multiplex telegraphy operations, it has a 10-watt power output.

AAR Communications Move

The communications section of the Association of American Railroads recently moved its headquarters from its 30 Vesey Street offices in New York to a new office in Chicago at 59 Van Buren Street. A. H. Grothmann is secretary of the communications section and L. E. Kearney, formerly a FCC engineer, is communications engineer.

Engstrom and Zworkyn Honored

The Medal of the Swedish Royal Academy of Engineering has been awarded to Dr. E. W. Engstrom, vice president in charge of research of the RCA Laboratories, and to Dr. V. K. Zworkyn, inventor of the iconoscope tube, for their work in radio and television invention and research.

UC Overseas Centers

As part of the Army and Air Force information and education program, arrangements have been completed for the establishment of 15 University of California centers in the Far East command. These centers will be located in Okinawa, Guam, the Philippines, and throughout Japan and will accommodate both military and American civilian personnel. The courses offered will be the same as resident instruction on the U of C campus and will provide an opportunity for obtaining nearly the first two years of resident university credit which may be applied toward a degree. This program is similar to that operated in the European command by the University of Maryland, in which nearly 1000 Army personnel are enrolled.

NAVY

Electronics Annual Session

With unification of the electronic activities of the Navy the dominant aim, and with the largest attendance in its history, the annual conference of the electronic officers of the Navy's Bureau of Ships was held at the Navy Department in Washington May 1-5. Capt. A. L. Becker, USN, chief of the BuShips electronics division, was the presiding chairman at all sessions.

Approximately 60 speakers, representing all phases of the Navy's electronic procurement and maintenance work in the department, at the shore establishments and shipyards and with the fleets at sea, gave the 140 officers a complete picture of the present and future activities and the requirements for the full preparedness of the Navy for national defense and in event of a war emergency.

The conference covered the new technical advances in the electronic and communications art, common problems such as technical advances in the improvement of service from BuShips to the fleets and shore establishments of the Navy, the maintenance and installation problems of electronic devices and equipment under the current strict economy, and the best methods of the use of electronic systems and weapons in national defense.

The speakers were from every bureau of the Navy, as well as the Director of Naval Communications, the Naval Research Laboratory, the Munitions Board, the Coast Guard, and others. Rear Admiral D. H. Clark, commanding the Bureau of Ships, gave the welcoming address and outlined the objectives of the conference on May 1. There were about 12 speakers a day at the morning and afternoon sessions, so

New-type glass for RCA television picture tubes filters unwanted light, to give sharper, clearer images.

Wayward light is disciplined—**for better television!**

Now television pictures gain still greater contrast and definition—through research originally initiated by scientists at RCA Laboratories.

Their discovery: That wandering light waves inside a picture tube—and even more important, *inside the glass itself*—may cause halation and blur an image's edges. But, by introducing light-absorbing materials into the glass, the wayward flashes are disciplined, and absorbed, so that only the light waves which actually make pictures can reach your eyes!

Glass companies, following this research, developed a new type of faceplate glass for RCA . . . Filterglass. Minute amounts of chemicals are added while the glass is being made, and give it, when the picture tube is inactive, a neutral gray tone. In action, images are sharper, clearer—with more brilliant contrast between light and dark areas. Reflected room light is also reduced.

* * *

See the latest in radio, television, and electronics at RCA Exhibition Hall, 36 W. 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, N. Y.

Filterglass faceplates give you more brilliant pictures on today's RCA Victor television receivers.

RADIO CORPORATION of AMERICA

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NEWS

that the conference participants had a tremendous amount of material to study and to take back to their posts.

Captain Becker drafted the conference program to bring the aims for the unification of all Navy electronics activities to obtain the greatest strength and advantages from electronic procurement, distribution to the fleet and shore bases, maintenance and installation, and continual betterment of equipment and uses of the latest electronic devices and systems.

Because the BuShips through its electronics division, for the first time since the war, is to receive a fairly substantial appropriation during the next fiscal year for the modernization of the Navy's electronic equipment, the conference was considered particularly important. Reports on the latest developments in a number of the key electronic devices and systems like radar, sonar, countermeasures, antisubmarine warfare, etc., were on the conference agenda.

Capt. Hull Joins Raytheon

Capt. David R. Hull, USN (Ret), who during the past ten years has been assistant technical director of the International Telephone & Telegraph Corp., will join the Raytheon Manufacturing Corp. on May 15 as assistant to Wallace L. Gifford, vice president in charge of Raytheon's equipment divisions, it was announced May 4 by Raytheon President Charles F. Adams, Jr.

In the Navy, Captain Hull, a 1925 graduate of the Naval Academy and holder of a Master of Science degree from Harvard University, specialized throughout his entire career in electronics, communication, radar and underwater sound development, design, and procurement, chiefly with the Naval Research Laboratory and the Bureau of Ships Electronics Division. During the decade prior to World War II, Captain Hull specialized in underwater sound and radar development. He also initiated the design and operational use of very high frequency radiotelephone equipment for fleet tactics.

Captain Hull is going back "home" to the Raytheon company. He graduated from the Newton, Mass., high school and was appointed to the Naval Academy by the late U. S. Senator Henry Cabot Lodge. With the I.T.&T. during the past two years he served as ivce president and director of the Federal Telecommunications Laboratories, the I.T.&T.'s domestic research organization. After I.T.&T.'s acquisition of the Farnsworth Television & Radio Corp., he was for a time executive vice president of the new Capehart-Farnsworth Corp. He is a member of the electronics equipment industry advisory committee of the Munitions Board.

A member of a number of scientific organizations, he is a Fellow of the Institute of Radio Engineers, and a member of the Acoustical Society of America, American Institute of Electrical Engineers, Society of Naval Engineers, American Institute of Physics, and U. S. Naval Institute.

Photos Aid Plane Search

VC-61, MIRAMAR—For the first known time in the Navy during or since the war, photographic reconnaissance and interpretation technique was used to search a large uninhabited area for a missing airplane.

Such a task fell to this squadron during its wintertime photo recco and mapping training program in preparation for future Alaskan operations. On 10 February, Ens. Charles E. Butler flying an F4U attached to VF-53 on the *Valley Forge* was missing in the Los Angeles-San Diego area. When last seen, he was over MCAS EL TORO and entered a cloud formation on the western edge of the Santa Ana mountains. He lost both visual and radio contact with five other *Corsairs*.

In the following three days, an intensive air search of southern California mountainous and offshore areas produced negative results. Estimating the Santa Ana mountains to be the most probable region concealing the missing pilot and aircraft, ComAirPac ordered VC-61 to photograph a 350-square mile rectangle enfolding the Santa Anas and to interpret the coverage in search of a possible parachute or plane crash.

On 13 February, VC-61 employed four *Liberators* photographed the mountains on a scale of 1:10,000 with K-17, 12" cameras and simultaneously on a scale of 1:5,000 with K-18, 24" cameras. Thirty-two rolls of aerial film containing 6,000 individual pictures were printed and turned over to VC--61 photo interpreters for intensive study over a continuous 48-hour period.

Pocket stereoscopes and magnifying glasses were used for preliminary study. Where light reflecting objects, disrupted natural vegetation or other unnatural terrestial features indicated a possible crash site, a magnifying Fairchild stereoscope was used to check these pinpoint images. Some of these objects were less than 20' in diameter on the earth's surface.

Supervised by officers experienced in photo interpretation and photogrammetry, both the aerial coverage assigned and the photo interpretation was considered as complete as possible for purposes covering a large area, acre by acre, for a minute object.

—*Naval Aviation News*

AIR FORCE

Rives Joins G.E.

Brigadier General Tom C. Rives, former chief of the electronics sub-division, Air Materiel Command, has been appointed to the staff of the commercial equipment division of the General Electric electronics department at Syracuse, N. Y., where he will handle special assignments for the manager of engineering.

General Rives retired 30 June 1949 aftter 33 years of military service. During World War I he served as chief of several divisions in the office of the Chief Signal Officer, and as deputy air communications officer of the Army Air Forces. He was given the permanent rank of brigadier general in 1944 and served as chief of the AMC's electronics sub-division from 1945 to his retirement in 1949.

Upon retirement General Rives joined the University of Illinois electrical department as an associate professor and was associated with the electrical engineering laboratories of the university's engineering experiment station.

For his radar work during the past year General Rives was awarded the Distinguished Service Medal. He also holds the Legion of Merit with Oak Leaf Cluster.

Merit Award For Vittles

Maj. Alden L. Van Buskirk, student, Air Command and Staff School, Air University, Maxwell AF Base, Ala., was presented the Legion of Merit May 15, by Brig. Gen. John A. Samford, commandant of the school. The ceremony took place in the office of General Samford.

This decoration was for exceptionally meritorious conduct in the performance of outstanding service during the period from June 26, 1948, to May 31, 1949.

The citation accompanying his award stated that as "Commanding Officer, 1946th AACS Squadron, Major Van Burkirk effectively solved the many complex problems created by the manifold increase in air traffic from the inception and continuance of the Berlin Airlift. He exhibited superior technical skill, initiative, and resourcefulness in establishing and implementing an efficient air traffic control system for the Berlin area. The noteworthy accomplishments of Major Van Buskirk reflect the highest credit upon himself and the United States Air Force."

Just prior to coming to Maxwell to attend the sixth regular course of the Air Command and Staff School, which he completed June 17, Major Van Buskirk was special assistant to the commanding officer, Hq, 1807th AACS Wing, Wiesbaden, Germany. He is scheduled to attend the next class of the air communication and electronic staff officers' course at Gunter AF Base, Ala., which will begin on July 17.

AACS Personnel Changes

Following are reassignments in AACS personnel:

Major John A. Dalto from Hq & Hq

Sq. Andrews AFB, to attend the Air Command and Staff School, Maxwell AFB, Ala., replaced by *Major Wilmer A. Randall* from 1807th AACS Wing, Wiesbaden, Germany; *Major Howland K. Johnston* from 1804th AACS Group, Elmendorf AFB, Alaska, to 503rd Aircraft Control and Warning Group, Roslyn, N. Y.; *Major Lester L. Gaylord* from Scott AFB, Ill., to 1934th AACS Sq, Kindley AFB, Bermuda; *Major Corinne E. Edwards* from Hq, AACS, Andrews AFB, to USAF Security Service, Brooks AFB, Texas.

Captain William D. Reeder from 1806th AACS Group, Albrook AFB, Canal Zone to Hq, AACS, Andrews AFB; *Captain Samuel M. Gilkey* from Hq, AACS, to Hq, USAF in the Inspector General Executive Office; *Captain Edward E. Powell* from Hq, AACS, to 1806th AACS Group, Albrook AFB, Canal Zone; *Captain Louis M. Jarcho* from Hq, AACS, to 1807th AACS Wing, Wiesbaden, Germany.

1st Lieutenant James B. Deas from Hq & Hq Sq, AACS, to 1808th AACS Wing, Tokyo, Japan; *1st Lieutenant Jack M. Anderson* from Hq & Hq Sq, AACS, to 1807th AACS Wing, Wiesbaden, Germany; *T/Sgt Daniel E. Harrison* from Hq, AACS, to 1809th AACS Group, Nagoya, Japan.

Lieutenant Colonel John Crawford, from Hq, AACS to 1808th AACS Wing, Tokyo, Japan.

Lieutenant Colonel Walter Berg, from 1807th AACS Wing, Germany, to Hq 1800th AACS Wing, Tinker AFB, Okla.

Major Dorsey Burke, from 1804th AACS Group, Alaska, to Hq and Hq Sq, USAF.

Majors Horace Peck and Perry Ragan, from 1805th AACS Group, Newfoundland, to 3310th Technical Training Wing, Scott AFB, Ill.

1st Lieutenant Richard L. Margraf, from Hq AACS to Hq and Hq Sq, US AF Security Service, Brooks AFB, Tex.

ARMY SIGNAL CORPS

CSO Returns From Europe

Major General Spencer B. Akin, Chief Signal Officer, returned to Washington June 6 after an extensive six-week inspection tour of Signal Corps installations in Europe and North Africa.

The Chief Signal Officer left for his inspection trip on April 17 and during the tour visited and inspected every Signal Corps installation and unit in half a dozen European countries and at Tangier in North Africa.

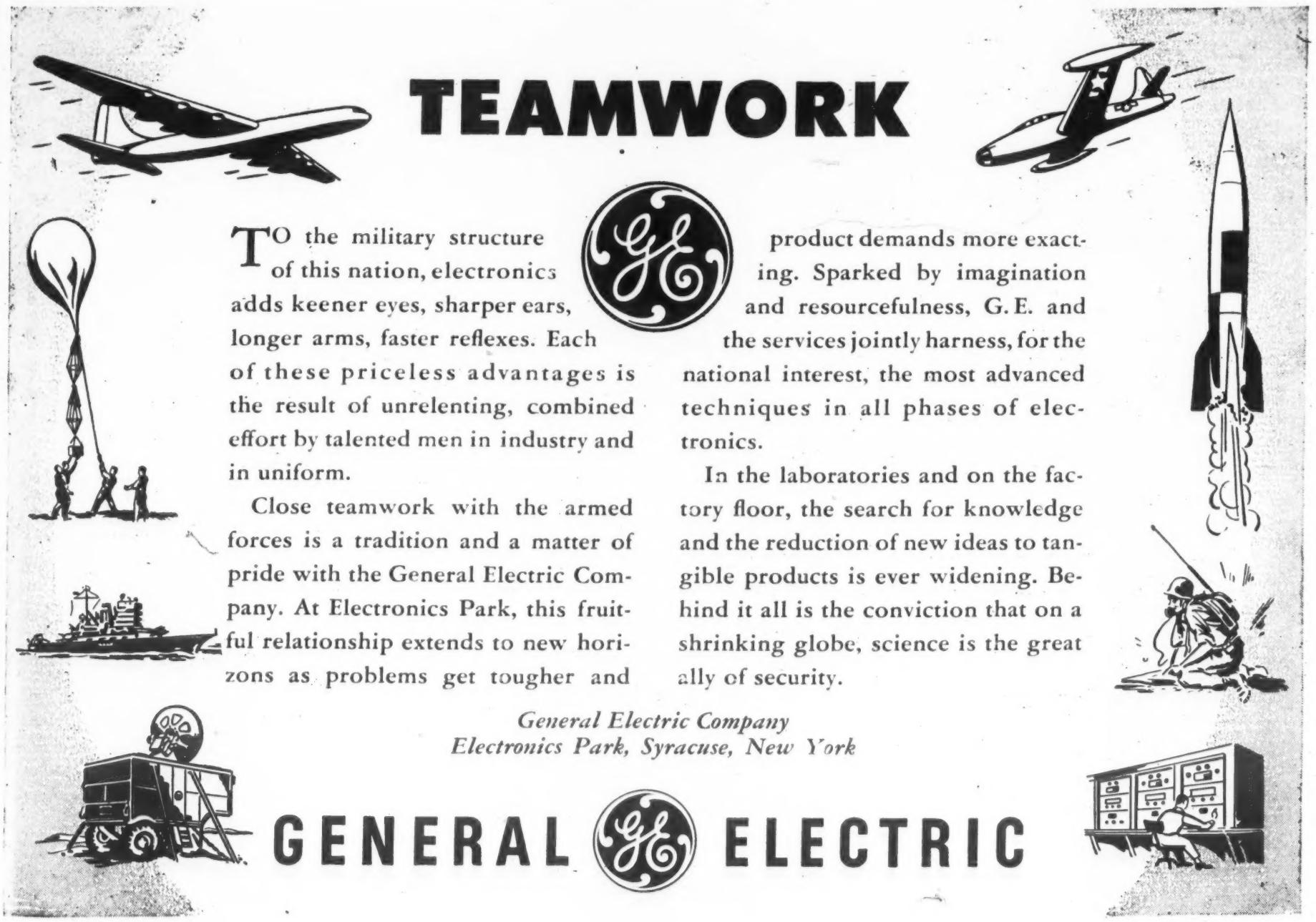
Glass Ribbon Capacitors

Through the use of glass ribbon in the place of mica sheets in miniature condensers, the U. S. Army Signal Corps expects to achieve a saving of 50 to 70 per cent in manpower during mass production.

The glass ribbon capacitors were developed by the Corning Glass works of Corning, New York, under a Signal Corps research and development contract. Glass ribbon is used as the dielectric, (the insulation between the charged plates of the condenser), and aluminum foil as the electrodes. They are sealed in a glass case that is impervious to atmospheric moisture and other troublesome climatic effects.

A huge manpower saving in mass production is foreseen because the glass ribbon will be of uniform thickness, whereas sheets of mica now have to be hand-sorted for uniform thickness and quality. From low frequency to self-resonant frequency, the new miniature capacitors equal or exceed the performance of equivalent mica condensers. The glass condensers are one-fifth to one-sixth the size of equivalent mica capacitors. In addition, production and stocking problems will be simplified by a reduction of grade styles from 15 to two.

Glass capacitors represent the second Signal Corps development in the field which helps relieve military dependence


TEAMWORK
TO the military structure of this nation, electronics adds keener eyes, sharper ears, longer arms, faster reflexes. Each of these priceless advantages is the result of unrelenting, combined effort by talented men in industry and in uniform.
Close teamwork with the armed forces is a tradition and a matter of pride with the General Electric Company. At Electronics Park, this fruitful relationship extends to new horizons as problems get tougher and product demands more exacting. Sparked by imagination and resourcefulness, G.E. and the services jointly harness, for the national interest, the most advanced techniques in all phases of electronics.
In the laboratories and on the factory floor, the search for knowledge and the reduction of new ideas to tangible products is ever widening. Behind it all is the conviction that on a shrinking globe, science is the great ally of security.
General Electric Company
Electronics Park, Syracuse, New York
GENERAL ELECTRIC

on high-grade mica, which must be imported. The first was the vitreous enamel, or ceramic, capacitor. Mica available domestically is of too low a grade to be suitable as a dielectric material.

SigCorps West Point Grads

The following 34 second lieutenants who graduated in June 1950, from the United States Military Academy, received commissions in the Signal Corps. They are listed alphabetically, not in order of standing.

2d Lt Grady H. Bannister
2d Lt Charles E. Bell, Jr.
2d Lt Joseph P. Buccolo
2d Lt Robert A. Cheney
2d Lt Albert B. Crawford, Jr.
2d Lt Reed E. Davis
2d Lt Louis F. Dixon
2d Lt James H. Fette
2d Lt Philip D. Fischer
2d Lt George R. Fullerton
2d Lt Franklin C. Gaillard
2d Lt Leonard J. Garrett
2d Lt George E. Hannan
2d Lt Louis B. Hansotte
2d Lt Norman F. Hubbard
2d Lt Howard O. Johns
2d Lt David D. Joy
2d Lt Neal B. Kindig
2d Lt Robert P. Leary
2d Lt Bernard P. Matthey
2d Lt Harold G. Nabhan
2d Lt Ralph D. Pinto
2d Lt Morton Ray
2d Lt James A. Ross, Jr.
2d Lt George H. Scithers
2d Lt Stanley P. Shankman
2d Lt Don F. Shreve
2d Lt Irwin I. Steinberg
2d Lt Charles F. Tonningsen
2d Lt Thomas H. Tullidge
2d Lt William C. Waddell
2d Lt John S. Wagoner
2d Lt John F. Wassenberg
2d Lt Francis W. White, Jr.

SC Personnel Changes

Guest Replaces Corput

Brigadier General Wesley T. Guest has been designated as alternate for Major General Spencer B. Akin, Chief Signal Officer, who is the Army representative on the telecommunications coordinating committee. General Guest replaces Brigadier General Rex. V. D. Corput, Jr., who has been transferred to duty in Europe. General Corput was the chief, Signal Plans and Operations Division, until his departure, and General Guest has assumed those duties also.

Kidwell Exec Officer

Colonel Francis E. Kidwell, for more than two years chief signal officer of the U. S. Army mission in Greece, has returned to this country to be executive officer to the Chief Signal Officer. Major Walter F. McDonald, former executive officer, is assisting Col. Kidwell. (*Through a mishap* SIGNALS' *report on this assignment is somewhat belated. Colonel Kidwell returned to the OCSigO in February.*)

King on Radar Panel

Colonel Cary J. King, Jr., OCSigO, has been designated Army representative on the panel on radar, committee on electronics, Research and Development Board. He replaces Mr. Norman A. Abbott, SigCorps engineer, who is now an associate member on the panel.

Major Edward N. Jenkins has been named an Army associate member of the panel on electronics countermeasures. R & D Board.

Assignments

The following have been assigned to OCSigO:

Lieutenant Colonel Clarence R. Dunlap, industrial mobilization branch, procurement and distribution division.

Captain Glenn A. Welde, operations and planning branch, signal plans and operations division.

Major Bernard A. Ferry, OCSigO.

1st Lieutenant Arthur V. Henri, signal plans and operations division.

Upon completion of courses at the Armed Forces Staff College, Norfolk, Virginia, the following will take assignments indicated:

Lieutenant Colonel Kirk Buchak, plant engineering agency, OCSigO.

Lieutenant Colonel Clinton W. Janes and

Lieutenant Colonel Elmer R. Littell, OCSigO.

Lieutenant Colonel Murray A. Little, Signal Corps Center, Fort Monmouth, N. J.

Captain George Van Laethem, formerly in career management branch, has been transferred to the Army Language School, Presidio of Monterey, California, as a student. Captain Joseph H. Williams of the Army command and administrative communications agency will go to the Signal School, Fort Monmouth, as a student.

The following will attend the eighth class of the Armed Forces Staff College beginning August 28:

Shooting at 40 Below

(*Continued from page* 7)

Meanwhile, our Aggressor team had been alerted by Aggressor HQ of the impending action and rolled 35 miles down the highway to cover. They found the three photo trucks lined up ahead of them, so, deciding a big battle was impending, they parked in No. 4 position and joined the photo melee.

The bewildered Aggressor defenders —all two of them—were "overwhelmed" by getting "shot" at all angles by the combined U. S.-Canadian combat cameramen. The PPCLI Patrol never did

(*Continued next page, col.* 1)

Lieutenant Colonels Orman G. Charles, James H. Fulton, William E. Heltzel, and Roland H. Mapes.

The following were ordered to civilian universities for classes beginning in June, 1950. They are listed with institutions they are attending and degrees they are working toward:

Lieutenant Colonel Walter E. Lotz, Jr. and Captain George M. Snead, Jr., *Doctor of Philosophy in Nuclear Physics at University of Virginia;* Lieutenant Colonel John G. Urban, *Doctor of Philosophy in Electronics Engineering, University of California,* Lieutenant Colonel William M. Van Harlingen, Jr., Major Joseph W. Benson, and 1st Lieutenant Alfor E. Allen, *Master of Science in Communications Engineering, University of Michigan;* Captain Marshall Waller and 1st Lieutenants William W. Hall, Jr., William F. Scharre, Jr., Herbert A. Schulke, Jr., Harold J. Stirling, *Master of Science in Communications Engineering, University of Illinois;* Major Glen S. Waterman, *Master of Science in Nuclear Physics, University of Virginia;* 1st Lieutenants John W. Fehrs and Bernard J. Pankowski, *Master of Science in Electronics Engineering, Massachusetts Institute of Technology.*

Top Grade Seniors of the Signal ROTC at New York University who were recently awarded the Distinguished Military Student's badge. L-R front row: Cadets William A. Bocchino, Pres. AFCA NY Univ. chapter; Emanuel Nobile, Jr., and Milton S. Greenwald. Back row: Frank J. Massas and Frederick D. Limmer.

Shooting at 40 Below

show up. We assume they saw the eight cameramen and thought they were Aggressor reinforcement, because no attack was made.

Next day, Colonel Dare of the Canadian Forces asked me to please keep my cameramen from "over-running" positions in advance of attacks as it confused the enemy and disconcerted our side.

Air "attacks" also gave us a bad time photographically. While press dispatches visioned "squadrons strafing truck convoys," often a lone F-82 would streak out of nowhere, skim the top of a solitary jeep—and that night we would hear how Aggressor air power had suddenly wiped out a good-size convoy.

Lest it be thought I consider all cameramen paragons, put upon by Fate and frost in the Yukon, let me insert here a few thoughts on captions. Our still cameramen could—and should—improve their caption-writing.

For example, during the shakedown period in Whitehorse, I toured the town to tie-in famous tourist spots with the services. When we found the church where Robert W. Service, famous poet, was a vestryman, I instructed the still cameraman to take a shot of the church right across the street from Sam McGee's Cabin. The cameraman was to caption it as the famous Whitehorse Log Church where Poet Service was a vestryman and probably got his inspiration for the poem on Sam McGee of Tennessee by seeing Sam's cabin across the way.

Editors, I have learned from experience, will often use a picture because of association, which might not be used because of pictorial appeal alone.

When I saw the McGee Cabin pictures used, but not the church, I began to wonder. Upon my return to Fifth Army HQ in Chicago, I called for the still picture file. There—in all its snowy glory—right across from Sam McGee's cabin stood the church with servicemen going in. And the caption—oh yes, the caption—it read "Old Log Church in Whitehorse."

The photographic lessons learned from the exercise, like the lessons learned by the other participants, made Sweetbriar worthwhile for all concerned.

All Equipment Winterized

For the benefit of those interested in the technical details of camera operation, the following details and hints are offered:

All cameras, motion picture and still, must be "winterized" for use. This means all possible lubraction removed, and all working parts to be well-broken in, as the cold contracts the metal and would cause new, unused cameras to stick.

Our main reliance, motion picture-wise, was the single-lens Eyemo (PH-330-H) which proved its worth in World War II. These cameras operated well, when the gears were generally free of oil or grease, and Bayol Type (P-38) oil was used where absolutely necessary.

To 40 below zero, the camera operated well when set for a 40-foot run on one winding. Lt. Klappert recommended that chamois be placed over the eyepiece and backplate to prevent the metal from sticking to the cameraman's cheek in extreme cold. Otherwise, the cameraman's cheek was likely to come off with the camera.

One major problem was the shifting of cameras from outdoors to indoors, causing frosting and moisture saturation. For indoor work, we used a standby camera, kept inside all the time.

Battery-operated cameras are practical in the sub-arctic and arctic only if means can be found to keep the batteries warm. To quote from Lieutenant Klappert's technical report:

"A Canadian Army cameraman used a 16mm battery-operated Bolex camera mounted on a gun stock during the entire maneuver. He used six-volt dry cells strapped across his back under parka and experienced no difficulty."

The still cameras operated with even less difficulty than the complexly geared motion picture ones. However, the Speed Graphics had minor troubles with range finders and shutter synchronization.

The flash guns, dependent on batteries, operated well once the batteries were arranged so they could be carried under the parka and kept warm by body warmth.

Fast films for both motion picture and still use are a must. The coldd slows film down in varying degrees according to speed and emulsion. Again quoting Lt. Klappert:

"Fast panchromatic films were found best for all around coverage . . . Super XX or Dupont Superior 3 were used almost exclusively. . . . In brilliant sunlight, an exposure of 1/50 of a second at f.16 was adequate. . . . Care should be taken in overcast weather, which predominates in the sub-arctic, because the light is usually more intense than it appears."

Still film exposures ran the same. Film packs gave trouble at low temperatures because paper tabs would rip when film was changed.

As a non-technical expert, I can only add: "No matter how overcast the horizon is—no matter what the book says—if you see a good picture—shoot under any conditions. You'll be surprised on how often you get something perfectionists claim is impossible."

The pay-off is not what is shot but what is used. Judged by this standard, Exercise Sweetbriar was a photographic success. The stills, published far and wide in the U. S.-Canadian press and such specialized journals as SIGNALS and the U. S. Naval Institute Proceedings, are still appearing in the numerous military and technical reports on the exercise.

The motion pictures, after being shown to millions in news reels and television, are being permanently utilized for training.

Once more the U. S. Army Signal Corps—teamed up with the Canadian Army Photographers and their RCAF and U. S. Air Force counterparts—have proven that you can take pictures at 40 below.

One of the most inspiring messages received came in a report on early shipments from Colonel Charles S. Stodter, now Chief, Army Pictorial Service. It read:

"Coverage overall very good cma exposures exceptionally good!"

To the frozen Signal Corps Photo Detachment in the overcast Yukon that was like a Distinguished Film Citation or an Oscar on ice.

Telephones without the "Bell"

(*Continued from page* 31)

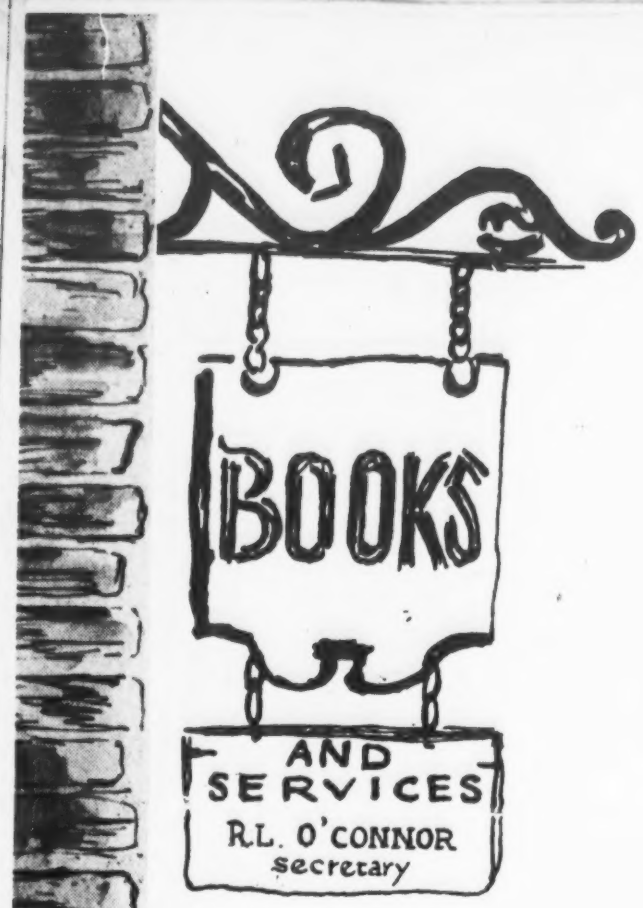
ing contributions to telephony by the Bell Laboratories; on the other hand, it is generally accepted that Independents have made important contributions to the art and were several years ahead of Bell in many advances, one example being the development and use of the dial telephone.

Incidentally, the little manufacturers who supplied the Independent telephone companies in the early days are now sizable businesses. Today these manufacturers supply most of the equipment used by the Independents and some used by the Bell, while the remainder is made by Bell-owned Western Electric.

Aside from some of the small marginal companies, the Independents have proved to be good investments. In many instances their operating ratios are lower than for Bell System companies. The larger Independents now finance in the same way as any other large business, and their securities are listed on the principal exchanges.

If there are any difficulties in raising equity capital today, they are, with certain exceptions, difficulties that are common to nearly all business. The exceptions are first, that telephone companies, like all other utilities, need capital in unprecedented amounts and second, that they have an additional problem in that they cannot change their prices or rates without approval of public service commissions and this process has in many cases proven to be too slow to meet rapidly changing costs. In some cases the commissions will not grant increases until the money has been raised and spent. This latter policy creates a problem similar to that of the chicken and the egg, and in many

(*Continued on page* 64)



THE U. S. ARMY IN THE WORLD WAR, 1917-1919. Vol. 5—Military Operations of the AEF, Champagne-Marne, Aisne-Marne\| $3.50. Vol. Vol. 6—Military Operations of the AEF, Oisne-Aisne, Ypres-Lys, Vittorio-Veneto. $3. Office of the Chief of Military History, Department of the Army.

Allied and enemy documents relating to the turning point of World War I have been published in volumes 5 and 6 of the Army's seventeen volume documentary series on the U. S. Army's part in the first world war.

Earlier volumes in the Army's documentary history of World War I have dealt with organization, policies, training and defensive operations. Publication of the series was begun in 1949. Besides containing reprints of documents directly relating to the conduct of military operations, the history also includes hitherto unpublished communications exchanged between Allied political and military leaders.

AN INDEX OF MONOGRAMS. Compiled and edited by Douglas P. Adams. John Wiley & Sons. $4.00.

A joint publication of Wiley and the Technology Press of the Massachusetts Institute of Technology, this book gives the location and content of seventeen hundred alignment diagrams published extensively in current technical journals. Emphasizing the use of nomograms—graphical devices designed to yield quick, accurate solutions to mathematical formulae—in practical engineering problems requiring the repeated use of the same equation, the Index covers a wide range of fields. Among these are: chemistry and chemical engineering; mathematics; physics; electricity, electronics and radio; hydraulics and power; aeronautics; waterworks and sewage; illumination; heating, piping and ventilating; oil and gas; building and surveying; mining; machine tools and design; metals; textiles; medicine; food; and transportation.

POCKET ENCYCLOPEDIA OF ATOMIC ENERGY. By Frank Gaynor. Philosophical Library, Inc. 204 pages. $7.50.

The purpose of this book is to present a comprehensive collection of brief explanations and definitions of concepts and terms in the field of nuclear physics and atomic energy to the scholar, researcher, teacher, librarian, student, and intelligent layman.

There are individual entries for every element, indicating: Chemical symbol, group of the periodic table, name of discoverer, date of discovery, atomic number, atomic weight, melting point, boiling point, specific gravity, stable isotopes, radioisotopes. Brief descriptions of the best known types of nuclear reactions are given. There is an entry for every member of the known radioactive families, indicating: Symbol, atomic number, mass number, parent isotope, daughter isotope, type of radiation and half-life. There are a great many brief and concise descriptions of subjects such as nuclear fission, tracer technique, atomic bombs, the "H-bomb," etc.

Further: Electrical, magnetic, chemical and physical units; important nuclear research laboratories, power plants, installations, etc.

Also: Thumbnail biographical sketches of outstanding nuclear physicists and chemists—in itself a pocket Who's Who of atomic science.

THE ARMY OFFICER'S PROMOTION GUIDE. Armed Force. $1.

This inexpensive but thoroughly comprehensive guide contains two lists, an alphabetical and numerical listing of the promotion status of all Regular Army officers from the highest ranking general in the Army to the lowest second lieutenant. Each name in the alphabetical listing is followed by the officer's position in the promotion list. The names on the numerical list are accompanied by data denoting the permanent rank of the officer, the temporary rank, the date of the permanent rank, and the seniority number within grade.

Accompanying the above will be such informative material as the complete text of the Officers' Personnel Act of 1947; pertinent parts of the Officers' Retirement Act of 1948; and the Career Compensation Act of 1949 plus a readable presentation of the effects of attrition through retirement, promotion and death on the officer's promotion future.

THE RADIO MANUAL. By George E. Sterling and Robert B. Monroe. 890 pages. D. Van Nostrand Company, Inc. $12.

The famed Sterling Radio Manual has long been recognized and used extensively as a standard textbook by radio schools and as a reference book by colleges and universities. This latest edition, the fourth, has been thoroughly revised and much new material has been added to bring the work completely up to date.

Probably no other book covers the entire field of radio so completely, from elementary electrical and radio theory, progressing through chapters on broadcasting (both AM and FM), radio navigational aids (including radar and loran), television, radio wave propagation, antennas, and radio equipment for the emergency services. Final chapters cover state, federal, and international laws under which radio and television operate.

Presently a commissioner of the FCC, Mr. Sterling* was formerly chief engineer of the commission. He is a member of the American Radio Relay League and a Fellow in the Institute of Radio Engineers. Mr. Monroe is a project engineer in the audio-video division of the CBS general engineering department. He is a Senior Member of the I. R. E.

**He was recently reappointed for a seven-year term beginning 1 July 1950.*

National Best Sellers

Compiled on a Percentage Basis from the Reports of 65 Booksellers as Listed in Publishers' Weekly for June 17

FICTION

1.	**The Cardinal, *by Henry Morton Robinson***	**$3.50,**	**$1.00**
2.	**The Wall, *by John Hersey***		**$4.00**
3.	**Star Money, *by Kathleen Winsor***		**$3.00**
4.	**Jubilee Trail, *by Gwen Bristow***		**$3.00**
5.	**The Plymouth Adventure, *by Ernest Gebler***		**$3.00**
6.	**The Egyptian, *by Mika Waltari***		**$3.75**
7.	**Wait for Tomorrow, *by Robert Wilder***		**$3.50**
8.	**Sleep Till Noon, *by Max Schulman***		**$2.00**
9.	**Homeward Borne, *by Ruth Chatterton***	**$3.00,**	**$1.00**
10.	**The Horse's Mouth, *by Joyce Cary***		**$3.00**

NONFICTION

1.	**The Grand Alliance, by *Winston S. Churchill***	**$6.00**
2.	**Worlds in Collision, *by Immanuel Velikovsky***	**$4.50**
3.	**The Mature Mind, by *H. A. Overstreet***	**$2.95**
4.	**Seeds of Treason, *by Ralph de Toledano-Victor Lasky***	**$3.50**
5.	**The Peabody Sisters of Salem, *by Louise Hall Tharp***	**$4.00**
6.	**The Art of Real Happiness, *by Norman Vincent Peale-Smiley Blanton***	**$2.75**
7.	**The Cocktail Party, *by T. S. Eliot***	**$3.00**
8.	**Look Younger, Live Longer, *by Gayelord Hauser***	**$3.00**
9.	**How I Raised Myself from Failure to Success in Selling, *by Frank Bettger***	**$3.95**
10.	**Chicago Confidential, *by Jack Lait-Lee Mortimer***	**$3.00**

Air University Review

With the publication of its Spring issue, the *Air University Quarterly Review* completes its third year as the professional journal of the Air University. This periodical is designed to stimulate healthy discussion of Air Force problems which may ultimately result in improvement of national security. Appropriate contributions of pertinent articles and correspondence which present new views, or refute or support old ones, are solicited.

The purpose of this publication is to inform Air Force personnel of the development of professional thought concerning doctrines of air strategy and tactics and related techniques.

Circulation of this journal covers the continental United States as well as many foreign countries. It is published quarterly by the Air University in Spanish and Portuguese editions as well as in English.

A prize of twenty-five dollars for the best guest editorial submitted for each issue is offered by the *Quarterly Review*. Entries are judged by the editor and the editorial board, whose judgment of quality and suitability for publication is final. Closing dates for receipt of submissions are December 1, March 1, June 1, and September 1.

The *Air University Quarterly Review* is especially recommended for U. S. Air Force Reserve and Air National Guard officers who desire to maintain their officer proficiency.

Subscriptions at $2 per year may be secured through the Air University Book Department, Maxwell Air Force Base, Montgomery, Alabama.

ON THE WISDOM OF AMERICA. By Lin Yutang. The John Day Company. 462 pages. $5.

Over in another column there is comment on a book published by the Philosophical Library. That publisher turns out books on science philosophy, and since we're semi-technical their works are supposedly appropriate to this section. Conversely, perhaps discussion of general philosophy doesn't fit so aptly. But when it's Lin Yutang who has turned out a new volume, then we're going to talk about him and his work, because he's a favorite in this department. If you don't know the witty Lin, you ought to, and with this, his latest, is a good time to become acquainted.

Lin Yutang takes a long look backwards at American thinking, in his newest work—"I remind myself that there has been some pretty vigorous thinking and writing in the last hundred and seventy years of American national life." He documents this assertion with quotations and excerpts from American writers through the years extending from Ben Franklin to E. B. White. And Lin Yutang is never one to neglect laughter—he includes Mark Twain, Clarence Day, and James Thurber. More than half the book, however, is Lin Yutang himself, his own keen observation.

The bewildered ones of the "where am I?"—do I exist?"—"am I real."—

Lin Yutang, author of "On The Wisdom of America"

"how do I know I exist?" school of philosophy have been quick to take offense at Lin Yutang commenting on America's wisdom. But we'll take the stand of another philosopher, of 400 years ago, that "thought too subtle is dull."—and we'll take Lin.

On The Wisdom of America progresses from an analysis on the scope of wisdom, through an examination of the brightness, sentiment, and joys of life, to a summing up—but its sections make of it an excellent bedside book for random reading of any of its parts. Some of these sections are The Wisdom of Living, Counsel for Living, Our Animal Heritage, Rhythm of Life, Man as Sentiment, Life, Liberty, Pursuit of Happiness, Arts of Living, Nature, God, Love, Laughter, War and Peace.

Lin Yutang's wise serenity is especially welcome in the present period when serenity is not common.

INSIGNIA OF THE ASSOCIATION

AVAILABLE TO MEMBERS FROM THE SERVICE DEPARTMENT

The insignia of the Association in several beautiful designs and convenient styles authorized for wear by members is available at the prices quoted below. Order from A.F.C.A. Service Department, 1624 Eye St., N. W., Washington 6, D. C. The insignia is described as follows:

The central figure is an alert powerful American eagle with strong talons clutching lightning flashes--symbolic of a strong America and national defense—especially insofar as modern communications is concerned, our basic reason for existence. The border consists of leaves of the olive branch of peace, showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signalling in sea and land warfare by United States forces. Just above the eagle and between his outstretched wings is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, and in Naval and Marine aviation. Above that is a radar antenna array, and at the very top a radio relay antenna—for the latest major step in military communications. And none of these could exist without industry—the foundation of AFCA. In the color version there are the traditional colors of the signal flags—dexter white with red center and sinister red with white center—with a gold border to the whole.

LAPEL BUTTON FOR CIVILIAN WEAR

Bronze	$1.50 (including tax)
Sterling	2.50 (including tax)
10-K Gold	5.00 (including tax)

Specify whether signal flags should be in red and white enamel or plain.

MEMBERSHIP CERTIFICATES

Printed on fine diploma paper with the Association emblem in full color and the member's name engrossed.
Price $1.50.

BINDER FOR SIGNALS

Red Leatherette with Gilt Lettering

The magazines can be placed in the binder easily, in a few minutes. Each binder holds one volume of SIGNALS (issues for 1 year). This handsome, stoutly constructed, durable, imitation leather cover will preserve your magazines permanently. Th name of the publication and the year of the issues contained therein will be stamped on the back of each binder.

Binders for previous years can be obtained at the same price. When ordering binders be sure to state the years desired.

EACH BINDER—PRICE $2.

Our Book Department can furnish, in limited quantity, any book currently in print. We will also help you to secure older titles that you may need to complete your library. A 10% discount is allowed all Association members on orders of $2.50 or more except for technical books. Please indicate author and publisher where known, and allow at least three weeks for procurement and delivery. (We will place orders also for any overseas or isolated station reader of SIGNALS, but without the discount if not a member.)

Telephones Without the "Bell"

(*Continued from page* 61)

cases the companies must seek capital somewhat on the basis of what the earning situation will be after the expenditures are made and the rates adjusted.

The whole telephone industry—Independent companies and Bell companies alike—has been experiencing a new phase of their business in having to seek rate increases, or at least rate increases of the size now being sought. Costs had been rising for more than a decade, but the rate of increase had been no more than the industry was able to offset by the improvements in its technology and the increase in efficiency of operation. Since the war, however, the increases in cost have been so steep and of such magnitude that it has not been possible to offset them completely by technological advances, even though there have been some notable advances which will have a material effect upon the economy of the business in the years to come.

Probably the greatest problem faced by all telephone companies today is how to catch up with the demand for service when almost every installation is accompanied by another application. In addition to the population growth since 1945, the number of telephones per 1,000 persons increased from 200 in that year to 271 by the end of 1949, a 36% increase in three years. And the applications are still coming in at about the same rate.

Communications Control of Aircraft

(*Continued from page* 30)

the transmitted signal and thereby nullifying the efficiency expected from rotary beam antennas.

Another limitation of this plan is the fact that CRPL predictions do not take into consideration the altitude of aircraft in flight. Some discrepancies have been noted when flying at high altitudes, since current predictions are made on a basis of radio operations between one point on the ground to another distant point on the ground. Possibly, in the near future, the Bureau of Standards may see fit to include this altitude feature in formulating their prediction data.

From the foregoing discourse it should be apparent to the reader that our Air Force commanders are entitled to have, and should be provided with communications services under their direct operational control which will afford them direct constant contact with their long range and special mission aircraft, especially in time of war when they may be carrying expensive destructive "packages" which must be delivered to the right place at the right time. Subjecting operational instructions dealing with missions of this sort to the numerous relay stations of today should not have to be tolerated.

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Signals in an Arctic Maneuver

(*Continued from page* 11)

the bulk of the still work being done at the Fifth Army Headquarters Laboratory, the motion picture film processing at the Signal Corps Photographic Center in Long Island City, New York.

Geographic and geomagnetic factors, from the viewpoint of Signals had their principal effects on radio propagation. Mountains in the exercise area limited the availability of suitable sites for transmitting and receiving stations. This was of particular importance at the higher frequencies used in frequency modulated and radio relay systems, where propagation is principally line-of-sight. In one operation shortly prior to the exercise VHF radio relay signals were bounced off the side of one mountain to get them past another which blocked the direct path between transmitter and receiver. During the actual exercise sime difficulty was experienced when distances between headquarters linked by the radio relay system exceeded the ranges normally expected of the equipment. Otherwise the Very High Frequencies functioned normally.

On at least two different occasions during the ten day exercise there were definite radio "black-outs" lasting a few hours apiece, during which high frequency communication was greatly curtailed. There was not sufficient experience with low frequencies during the exercise to serve as a basis for comment in this connection. Very high frequency radio relay communication was affected slightly by the radio "blackouts"—the effect being an increased noise level—much the same as on high frequencies. Frequency modulated communication was not affected to a noticeable extent. Auroral affects were apparent several times during the exercise. It became necessary in at least one instance to use radio sets with a normal 100-mile range to cover distances of 15 miles and relay traffic in order to maintain radio communication. Conditions were found where ground wave signals, both FM and AM, were absorbed to the extent that radio communications were impossible when sets were within sight of each other. The problems encountered with radio propagation appeared to fall in three categories:

a. Areas in which mineral deposits absorbed radio signals to the extent that ground wave communications became impossible;

b. The disappearance for short periods of time of the E layer of the ionosphere so that sky wave radio transmission was made difficult if not impossible; and

c. Auroral effects increased noise level on circuits thereby reducing range and readability of signal.

Despite the cold weather and the many difficulties encountered, many of which were expected and others unexpected, the exercise was successful. It had shown that the armed forces of the United States and Canada can work together even down to the smallest units, and that they can carry on combat operations in the Arctic, using equipment and supplies that already exist. It had shown where improvements are desirable in our equipment and supplies to make such equipment and supplies more effective. The armed forces of the United States and Canada had learned some of the things about cold weather that the people of Russia have known for many years, which the German army learned through bitter experience. It had been worth while.

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Low Inventory

Fewer parts need be stocked to assure highest continuity of service. Single base assembly serves all models—desk or wall, dial or magneto. Components are universally interchangeable.

Easier Maintenance

Masterphones are the easiest of all telephones to install, maintain or adjust. Universal circuit grid is unit-stamped—permanently hooked up—requires no attention. Snap-on cover makes inspection of switch springs and contacts quick and simple.

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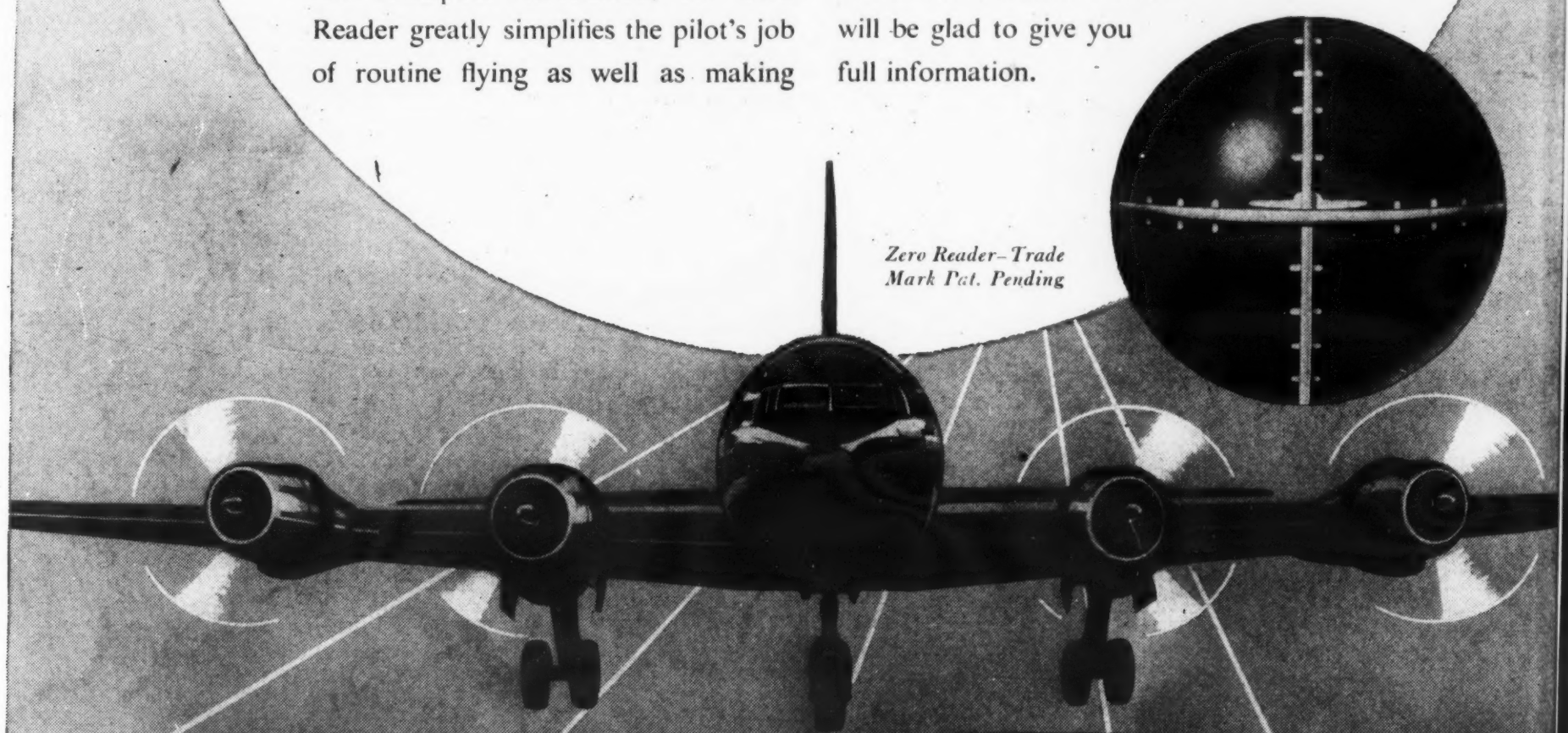

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